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Aijaz A. Bandey

Prehistoric Kashmir

Archaeological History of Palaeolithic & Neolithic Cultures

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Archaeological History of Palaeolithic & Neolithic Cultures

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Dilpreet Publishing House
New Delhi

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The work was a project assignment of the Centre of Central Asian Studies, University of Kashmir, Srinagar.

First published: 2009

ISBN No. 81-86762-38-8

Price: Rs. 800 or US$. 40.

954.6
BAN

Cover Design: Akhtar Rasool

Printed at: Prince Art Printers, Darya Gunj, New Delhi, India.
Call: 0-9811008439

Published on behalf of the author by M/S Dilpreet Publishing House,
4394/4, Ansari Road, New Delhi, 110002, India.
Call: 0-9212116769

Srinagar Business Centre/ Enquiries: Bliss, M. K. Chowk, Hawal, Srinagar- 190011
Call: 0194-2143598; 0-9419085969
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Dedicated to my mother,
A source behind my studies
&
In the loving memory of the departed souls,
Atoof, my son
Papa, my father
and
Prof K T M Hegde, my teacher.

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Preface

Unlikely as it may seem, this is the first full-length study of prehistoric Kashmir ever to appear. This is not to suggest that no notice of the subject has been taken till now: but earlier works have tended to be fragmentary. This study sets out a comprehensive view of what constituted prehistoric era in Kashmir, and to reconstruct the social and economic context of the period. In many ways, then, it needs to be seen as a pioneering work: exciting and capable of opening up further areas of enquiry while raising issues of significance.

The materials that have gone in to this book have taken long years to collect and analyse, primarily because it is scattered. The study could be brought to completion only when I completed my Ph. D thesis on the subject *"Neolithic Culture of Kashmir: A study in Socio-Economic Implications"*. The present work is an advanced and revised version of it, even though the basic structure has not been changed to any appreciable extent, save the addition of more facets to present a cohesive description of the prehistoric human societies. The aim of this project was to understand the pattern of civilizations living in the region on the basis of archaeological research and history of sciences. It was also aimed to fill a yawning gap in the history of Kashmir as prehistoric studies have tended to be excluded from the main focus of the historical attention.

The book is intended to supply the want felt by students and scholars alike. In fact it is framed to serve as a text book as well as a reference material on the subject. As a matter of fact we have tried to be as simple as possible so that any one interested in the history of Kashmir would be blessed to understand the otherwise a technical subject. Quite obviously, it is based on evidence drawn from archaeological sources unearthed in Kashmir during the past century and the researches carried out in allied subjects.

Doubtlessly the fascinating explorations of H. de Terra and T. T. Paterson and their comprehensive recordings have attracted scholars but comparatively recent interdisciplinary works on palaeo-botany, environment, climate, ecology, physiography, etc in Kashmir and

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Punjab Siwaliks by scientists drawn from various disciplines have revealed some unnoticed facts that serve as model to enlarge the scope of the works like this. Similarly the pioneering work on the archaeological research by Prof H. D. Sankalia, *et al*, has changed the course of the research in Kashmir. Likewise the work of T. N. Kazanchi and A. K. Sharma is extraordinarily significant. In spite of that to build the vivid history of early man in Kashmir is not very easy as most of the archaeological and stratigraphical details of their excavations at Burzahom and Gofkral remain unpublished.

The application of new techniques and using appropriate methodology has started to revolutionise the archaeological research. There is hardly any need to lay hand on enormous quantities of material if it is not arranged in a descriptive historic manner, in spatio-temporal way. We have taken a conjunctive interdisciplinary approach not only to describe the cultures and civilizations but also have taken an approach to find their philosophical foundation to describe ideas about the societies and their evolution. Accordingly we have tried to devise an explicit model that may be followed by future researchers to answer not only *what, when* and *where* but also the *why* of the cultural variations.

We have consciously tried to verify the data, large or small, to indicate empirical validity or otherwise of it so that a logical formulation is presented. How far we have been successful will be judged by the readers but plausible rather than hunch explanations of various phenomenons, societies or cultures have been stressed after testing the prepositions. It has allowed us to draw conclusions of the cultural phenomenon as logically as was possible. Still we believe future investigators will supplement the given information and same may take care of the short comings that remain in the work, in particular the questions we have not answered for want of sufficient evidence.

This work is an effort of many years of painstaking labour. Notwithstanding that we received whole hearted support and help from number of scholars, institutions and friends. My debts are thus many. It is pleasure to acknowledge them. I received sustained support, help and guidance from my colleague, friend and supervisor, Prof. M.

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A. Kaw, Centre of Central Asian Studies, University of Kashmir. He infused life in to the body of the work. I am beholden to him for the patient, cordial and pleasant devotion he has put in and has also goaded me to get it published.

Dr John Siudmak of Oxford, UK gratefully accepted to read the manuscript and pinpointed weaknesses in the structure of the work. I was fortunate in receiving help from him in so many meaningful ways that I have no words to thank a friend like him. Prof Shafi Shouq of the P. G. Department of Kashmiri, University of Kashmir has also suggested improvements for which I am grateful to him.

I was kindly given access to many collections, public and private, for which I am most thankful. I would especially like to acknowledge the help in this respect of Shri M. C. Joshi, former Director General, and Shri B. M. Pande, former Director, Archaeological Survey of India, New Delhi. Like them of great help were staff members of the Central Library, ASI, New Delhi. Including them my thanks are due to ASI Library, Srinagar Circle, National Library, Kolkatta, Moulana Azad Library of AMU, Aligrah, Library of Birbal Sahani Institute of Palaeobotany, Lucknow, Library of Geological Survey of India, Srinagar, Research Library, Srinagar, Library of the Centre of Central Asian Studies, Srinagar, Library of S. P. S. Museum, Srinagar and Allama Iqbal Library of Kashmir University.

Many other individuals were of immense help, like late Prof G. M. Buth of P. G. Department of Botany, Kashmir University who kept at my disposal his vast material on palaeobotany and primitive agriculture which has deepened my study on the subject. May God bless his soul with peace. Similarly Raj Nath Kaw of ASI, New Delhi was of great help in locating the material in Delhi and often keeping track of fresh arrivals on the subject. I express my thanks to him. I owe my thanks to Dr. D. P. Agrawal and Dr. R. K. Pant for providing many of their research papers for study and utilisation in this work. I had also the privilege to have an elderly company of Shri Sardari Lal Shali with whom it was always great to discuss the subject. I also owe my debt to the workers that served during the excavations at Burzahom and Gofkral who generously explained my quires.

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For the illustrations used in this work I acknowledge the courtesy of ASI, Late Prof H. D. Sankalia, Prof S. B. Deo and Prof R. V. Joshi of the Deccan College, Pune and Shri S. S. Saar of ASI, New Delhi. I also acknowledge the help received from M/S Iqbal Ahmad and Nazir Ahmad Doshab of the Centre of Central Asian Studies, University of Kashmir in preparing the illustrations for the work and helping in many other ways. Equally, B. A. Mir of the Centre was a great support.

I also express my sincere gratitude to my friends who often helped me to take sojourns to various archaeological sites across the Valley. Like them numerous people of the Valley walked long distances along with me to help to reach a site in pursuit of the archaeological material. In disturbed days, their company was psychologically the sole comfort. I place on record my sincere thanks to all of them.

The faculty of the Centre of Central Asian Studies and its various Directors, with whom I had the privilege to work, kindly provided the solace of a family. Their love and affection has always helped and I shall remember their generosity. Equal in affection have been Prof A. Q. Rafiqi of the P. G. Department of History, Prof A. R. Khan of P. G. Department of Zoology and Reyaz Rufai, Librarian of the Allama Iqbal Library, University of Kashmir. It is an honour that I have enjoyed their company. Unfortunately the loving company of friend like Roshan Lal Safaya has been deprived by the circumstances we are living in the past twenty years. This loss has not been filled.

My wife, Nuzhat and children, Mab, Ayat and Aseef, are superbly kind and un-noticingly have provided me time to finish the work. I am indebted to them for the most treasured affection they shower on me.

I own responsibility for the inadvertent errors that may have crept in as I have typed and set the work on the computer myself. The printers were kind to finish the job professionally and gladly acknowledge their help.

Aijaz A Bandey

Srinagar
August, 2009.

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Chapter I

GEOPHYSICAL FORMATION AND PALEOENVIRONMENT OF PREHISTORIC KASHMIR

The accounts of Kashmir, starting from the days of *Nilmata Purana* and *Kalhan's Rajatarangini,* take back the history of her inhabitants to an age that was in essence prehistoric in nature and character. Nevertheless such records seem to be mythical in order, often, without providing substantial reasons to prove them. Again, some of these accounts claim to have used archaeological data for the reconstruction of the bygone societies but not much attention was paid to the factors relevant to the survival and development of human culture.

Like these, archaeologists in the past have conveyed that prehistoric societies, both Palaeolithic and Neolithic, were barbaric in character who were somehow organising their effort only for their sustenance. Such hypothetical conclusions were drawn on the evidence of tool equipment, mostly in stone, that these societies have left behind. Social developments or behavioural aspects have been mostly ignored in the interpretations as archaeological relics are not often directly speaking about such developments.

True, there is often less archaeological data available to make broad classified framework of the past human societies but archaeological research has progressed beyond the 'antiquarian artefacts' and much emphasis is on interdisciplinary approach to study the theoretical and philosophical foundation of societies and cultures on logical grounds to build economic, sociological and behavioural aspects for the reconstruction of past human societies. Artefacts in any case are important that represent ideas, beliefs and preferences yet along with are also important the empirically measurable ecological variants for interpretations. Such variants as increasing or decreasing food sources or human population, their spatial or random distribution

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or else density of cultural deposits at a place may have in fact depended on the environmental factors.

Accordingly to describe the physical and environmental context in which the past human cultures existed, archaeology today emphasises to study an area as a whole and understand its geomorphology, palaeoenvironment, palaeoclimate, palaeontology and palaeobotany. Such categories of evidence, in association of scientific chronometric dating, have become very important tools for building Kashmir history; in particular of the prehistoric times that is rather complex in nature.

To understand the existing conditions in which the prehistoric cultures survived and developed it is imperative to know about the geo-physical state of the land, the climatic and environmental conditions as well as the plant and animal life. A broad understanding of these entities will provide substantial ground for undertaking research on the multi-dimensional aspects of the history of prehistoric Kashmir.

Geological and Glacial Evidence:

There is a general consensus among earth scientists that "Continental Drift" and plate tectonics of the earth have played an important role, at different geological times[1], to give the earth its present shape. The earth scientists hold that during the Miocene epoch, as a result of plate tectonics, the Indian sub-continent, which up to that time was an island in the Indian Ocean, drifted up against southern

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1 Geologically the earth's history goes back to 4.5 billion years which is divided into several periods; the last of it is called Tertiary (Cenozoic Era) and is divided into six separate geological epochs as:

Holocene = 10,000 BC to the present
Pleistocene = 2 million years before present (MY BP) to 10,000 BC
Pliocene = 5 – 2 MY BP
Miocene = 25 - 5 MY BP
Oligocene = 35 - 25 MY BP
Eocene = 60 - 35 MY BP
Paleocene = 70 - 60 MY BP

Martin K. Nickels, David E. Hanter and Philip Whitten, *The Study of Physical Anthropology and Archaeology*, London, 1979, pp. 167-169.

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Eurasia. The collision gave rise in the geological formation of the Himalayas[2]. By about the middle of the epoch the connected land formation in the Himalayan region was almost complete.

Corresponding to it Kashmir also appeared in the present day world map during the later stages of the Himalayan orogeny.[3] It again underwent a series of geological, morphological and environmental changes of far-reaching impact, so much so that these radically altered not only the physiography but also affecting the course of its drainage. The end result was that the basin was transformed into a vast lake without any outlet for drainage – a fact borne out by historical myth also.[4]

Today the boat shaped Valley is guarded in the north and northeast by the mighty Himalayan ranges and on the south and southwest by the Pir Panjal ranges. The glittering snow-clad high mountain ranges, vast and high table lands along the mountain ridges, lush green landscape of extensive meadows, gushing brooks and streams dancing over the thick alpine forest covered mountain slopes to meet the placed and serpentine drain of the Jehlum and the cool pleasant climate make the area *a paradise on earth.* However, when the early prehistoric man became its first inhabitant all this was not there to live in. The morphology of the landscape shows that fairly radical changes, both physical as well as climatic, occurred there in the past.

A European traveller, Charles Von Hugel in 1840, was perhaps the first to report about some of the past geological changes in Kashmir. He observed that it once formed of an extended lake in which

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2 Martin K. Nickels, *et al, The Study of Physical Anthropology and Archaeology.*

3 D. P. Agrawal, *Man and Environment in India through Ages*, New Delhi, 1992, pp. 44-45.

4 Nilmata Purana, a 6th/7th century AD Sanskrit text of Kashmir, records that Kashmir was once a vast lake, called *Satisar*, where a demon Jalodbhava caused distress to the Nagas – the earliest subhuman habitation living there. Kashyapa, the grandson of god Brahma, invoked god Vishnu; who as a boar incarnation (*varaha*) struck the mountains near Baramulla (*Varamul*) opening the lake to drain where after he was able to kill the demon to rescue the land so formed for the habitation of man; *The Nilmata Purana*, verse 29-227, english translation, Ved Kumari Ghai, Vol. I, Srinagar, 1968; as also *Kalhan's Rajatarangini*, english translation, M. A. Stein, Book I, V. 25-27, Delhi, 1977 edition.

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lacustrine mud deposits got accumulated, and subsequently the lake water flowed out through a breach caused by earth-quakes in the north-western Himalayan range.[5] The lake deposits of mud, placed along the periphery of the mountain ranges, are now called *karewas*[6]. These high table lands were regarded by Godwin-Austen, an early writer on the geology of Kashmir, to have originated in two different ages, one series younger in age than the other.[7] Drew, the first state-appointed geologist, further differentiated the two types of karewas by noting that one group is placed horizontally and the other is tilted.[8] Lydekker, for the first time, used the term Lower Karewas and Upper Karewas for the tilted and the horizontal beds respectively.[9]

Thereafter, three leading explorers, Hellmut de Terra, T. T. Paterson and P. Teilhard de Chardin, sponsored by the Carnegie Institution of Washington, Yale-Cambridge Universities and the American Philosophical Society, did pioneering work on the Pleistocene geomorphology of Kashmir, Potwar and Jammu. They too testified to the presence of a vast Pleistocene lake in Kashmir in which there was an accumulation of diverse materials like silts, clays, gravels, etc to constitute the karewas.

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5 Charles Von Hugel *Kashmir und Res Reich der Siek* (German), Stuttgart, 1840, c.f. D. P. Agrawal, *Man and Environment in India.*

6 *Karewas* or *wudars,* as called locally, are flat-surfaced plateaus or table lands on the border of the Jehlum flood-plain flanking the surrounding mountain precipices. The superficial deposits contain lacustrine and fluviate deposits, terminal moraines, glacial clays, gravel and sands.

7 H. H. Godwin–Austen, 'On the Lacustrine and Karewa deposits of Kashmir *Geological Society London Quarterly Journal,* Vol. 15, 1859, pp. 221-29. 'Notes on the Valley of Kashmir' *Royal Geographical Society Journal,* Vol. 31, 1861, pp. 301-31 *'Geological Society London Quarterly Journal,* Vol. 20, 1864, pp. 383-88. He noted the earlier series at Hirpur in the south-west Kashmir, now called Hirpur series, and the latter, sub-divided into Islamabad series, found at Islamabad in the south-east of the Valley and Baramulla series, the low level terraces found at Baramulla in the north-west of Kashmir.

8 F. Drew, *The Jamoo and Kashmir Territories,* London, 1875

9 R. Lydekker, found the tilted beds associated with blue clays and conglomerates while the flat topped horizontal beds contained brown clays with sand deposits, 'Notes on Geology of Kashmir, Kistawar and Pagani', *India Geological Survey Memorial,* Vol. 22, 1883, pp. 1-344.

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Besides the geomorphology they also worked on the past climate of Kashmir to find out that that there were four glacial stages in the Pleistocene. According to the correlation worked out for the stratigraphy of the karewas and the glacial deposits, and the time span of their formation, they found that the basic layer of the karewas is formed of terminal moraines of the first phase of the Pleistocene glaciation which in turn are resting over the Palaeozoic and Triassic basement rock. Further it was estimated that the karewas have grown between the Lower and the Middle Pleistocene epoch,[10] precisely between the end of the first Glacial and the end of the second Inter-glacial stage of Pleistocene glaciation, as is summarily shown in the following table:

Table I: (Bottom to top)

Geological Period	Glacial Period	Nature of the formation
Middle Pleistocene	II Interglacial Stage	Upper Karewa
Middle Pleistocene	II Glacial Stage	Lower Karewa
Lower Pleistocene	I Interglacial Stage	Lower Karewa
Lower Pleistocene	I Glacial Stage	Terminal moraines

(Compiled on the basis of the work of de Terra and Paterson; 1939, Washington)

Another leading geologist, D. N. Wadia, while attesting the observations of de Terra and Paterson, however, modified the time span that was taken for the formation of the karewas.[11] The observations, as reproduced in Table II, show that it was during the entire period of Pleistocene epoch that the karewas were formed. The Lower Karewas developed in the Lower Pleistocene whereas the Upper Karewas accumulated in the remaining part of the Pleistocene.

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10 H. Hellmut de Terra and T. T. Paterson, *Studies in Ice Age of India and Associated Human Cultures*, Washington, 1939.

11 D. N. Wadia, *Geology of India*, New Delhi, 1970 Ed.

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Table II: (Bottom to top)		
Geological Period	**Glacial Period**	**Formation**
Upper Pleistocene	IV Glacial Stage	Upper Karewa
Upper Pleistocene	III Glacial Stage	Upper Karewa
Middle Pleistocene	II Glacial Stage	Upper Karewa
Lower Pleistocene	I Glacial Stage	Lower Karewa

(Compiled on the basis of the work of D. N. Wadia, 1970, Delhi)

Earlier geologists like Lydekker and Middlemiss, and later on Sahni, made contrary assertions that the karewa sediments[12] accumulated between the Upper Pliocene to the Pleistocene epochs.[13]

Besides exploring the physical conditions, de Terra and Paterson also found the record of the past Ice Age scattered through out Kashmir on its hills and in the karewas. Their work remains the major source of information on the climate and glaciations[14] in the Pleistocene

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12 Godwin-Austen, *Geological Society London*, 1859, p. 211, maintained that these are lacustrine sediments – a fact agreed to by I. B. Singh also, 'Sedimentation Pattern in the Karewa basin Kashmir and its geological significance', *Journal of Palaeontological Society of India*, Vol. 27, 1982, p. 71. But de Terra and Paterson argue that these were partly lacustrine and partly fluvitle in nature, the latter noticeable in the upper part or the Upper Karewas only, accumulated during the course of the drainage of the lake, *Studies in the Ice Age*.

13 According to Lydekker (*op.cit*) the karewas developed at a time when the Upper Siwaliks came into being during the Upper Pliocene epoch; C. S. Middlemiss, ('Lignite coal fields in the Karewa formation of Kashmir Valley' *Recording of Geological Survey of India*, Vol. 55, 1924, pp. 241-53) and B. Sahni, ('The Karewas of Kashmir'. *Current Science*, Vol. 55, No. 1, 1936, pp. 10-16) have agreed that the base of the karewas came into existence during the Pliocene epoch, and Sahni further elaborated to make it clear that the Upper Karewa formation took place during the Pleistocene age.

14 A glacier is a body of ice and firn (more than one year old snow is firn which gets converted into ice by further accumulation of snow thereby forcing air out of the diminishing intergranular spaces). The glaciers under the influence of gravity flow out from the snowfield they originate from. At present one tenth of the land surface is covered by glaciers, mostly at the poles, but during the more wide spread glaciations in the Pleistocene epoch, this proportion was as large as one third of land surface of the world, R. F. Flint, *Glacial Geology and the Pleistocene Epoch*, New York, 4th Edition, 1953.

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Kashmir.[15] According to their estimation, Kashmir experienced, during the Pleistocene epoch, four very cold climatic situations, called glacial stages, distinguished from each other by three warm climatic conditions, called interglacial stages (the figures, 1-4, show the proportionate magnitude of four glaciations in Kashmir and the extant of the area under glacial activity, the stippled area is glaciated and snow-bound terrain).

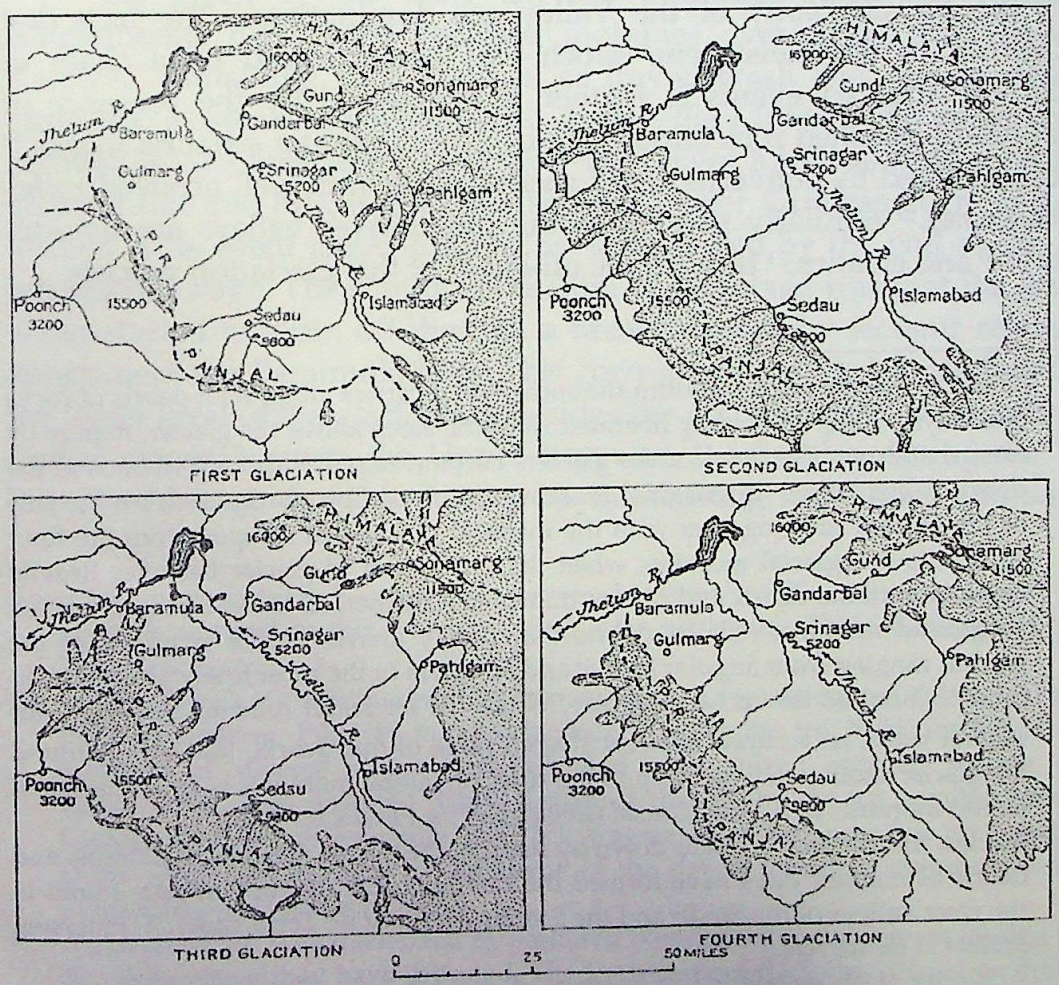

Fig 1-4, Proportionate magnitude of 4- glaciations in Kashmir

15 Hellmut de Terra and T. T. Paterson, *Studies in the Ice Age.*

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The imprints of this glaciation are amply reflected by buff coloured sand and laminated clays deposited in the karewas during the interglacial periods and the terminal moraines[16] left behind by the glaciers. The north eastern face of the Pir Panjal is covered with moraine material, while the terraces located in the upper valleys of the river Jehlum contain moraine contents mixed with fluvio-glacial deposits,[17] which lead to understand that such glaciated related effects on the physiography of the Valley are dominating. The fact, that Kashmir in the Pleistocene epoch was characterized by a chain of glaciate oriented events is further authenticated by the presence of abundant polished rock surfaces, rock groovings and striation marks,[18] accompanied by converted hard rock surfaces into well grooved *roche-moutonnes*.[19] Similarly present in the upper river valleys are boulder clays[20] and erratics,[21] that are the off-shoot of this glaciation process.

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16 While the glacier flows out from the snowfield it carries along with debris of rocks and clays, which are mostly liberated from the steep above the glacier, mainly by frost shattering. The sides of the glaciers become edged with long ribbons of the debris called lateral or marginal moraines. A certain proportion reaches the sole of the glaciers and together with the material plucked or scraped from the floor constitute sub-glacial moraine; when the lower part of glacier becomes heavily charged with the debris and cannot transport it further, all the excess is deposited as ground moraine. All the debris that finally arrives at the terminus of the glacier, ranging from angular blocks and boulders to the most finely ground rock-flour is dumped down haphazardly. When the ice snout remains stationary for several years, an accurate crescent shaped ridge of this debris, that curve around the glacier snout and extend up to the sides on lateral moraines is, called terminal or end moraine, R. F. Flint, *Glacial Geology and the Pleistocene Epoch.*

17 Besides, the material brought down by streams the glacial deposits of moraine and debris of boulder clays have formed the fluvial glacial deposits, mostly found in the river valleys of the Sindh and the Liddar, Hellmut de Terra and T. T. Paterson, *Studies in the Ice Age.*

18 A glacier with embedded fragments of rocks is an effective tool for eroding massive rocks. The larger fragments groove the floor and sides of the underlying rocks or those themselves are worn flat and striated. A finer material frozen into the sole of glacier act like a sand paper and smoothes and polishes the rock surfaces, R. F. Flint, *Glacial Geology and the Pleistocene Epoch.*

19 The up stream sides of most hills and rocks, over ridden by ice were rounded, polished or grooved; whereas down stream sides were irregularly jagged. Rock

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The significant environmental and the climatic situation reciprocated in laying new geophysical formations that are part of the present day physiography of the landscape. The role played by the glacial sequence in shaping many of these geological entities is demonstrated by the tables III & IV, which also summarize the major work of de Terra and Paterson on the subject.

As given in the table III, the I Glacial stage left behind conglomerate beds[22] and terminal moraines over which the Lower Karewas, containing such material as fluvial wash and aeolian drift, came into existence. This happened during the I Interglacial period on account of lake formation. Thereafter the Lower Karewas continued to grow in size and height until the time the Upper Karewas begin to get formed. This event is recorded to have happened by the end of the II Interglacial stage. The significant feature of this stage was that the lake water started to drain off through a breach caused by tectonic related events near the Baramulla hills. This correspondingly led to decline in the water level of the glacial lake besides the accumulation of abundant fluvial materials upon the Upper Karewas. It was also during the II Interglacial stage that first terrace on the existing formations and soft

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knobs sculptured in this way are called *roche-moutonnes*; *Glacial Geology and the Pleistocene Epoch.*

20 Glaciers which are effective eroding agents release a vast amount of debris at their front by melting. Piled in hummocky ridges along the ice front are heaps of boulders of diverse sizes, sand, silt and clay, mixed without sorting or stratification. Such unsorted debris deposited directly by the ice is called tilt or boulder clay, which generally has rock fragments of sub rounded or angular shape which is dissimilar to the shape of the debris found in streams, *Glacial Geology and the Pleistocene Epoch..*

21 A glacial region is characterized by scattered boulders of rocks that are foreign to the place where they have dropped. The ice transported blocks, carried far from their present outcrops, are called erratic. These striking monuments indicate the passage and movement of glaciers towards a particular passage; *Glacial Geology and the Pleistocene Epoch.*

22 Conglomerate beds are mainly composed of boulders, angular stones and pebbles along with rock flour. The rock flour being calcareous in nature, cement the sediments to form a hard concrete like formation during glacial conditions, *Glacial Geology and the Pleistocene Epoch.*

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silts of exposed karewas, was formed by the river tributaries to meet the water level in the receding lake.

Table III (Bottom to top)			
Age	**Glacial Stage**	**Geological Entity**	**Events**
Holocene	Post-glacial Stage	Deposition of loess Formation of Terrace 5 (T5)	
Upper Pleistocene	IV Glacial Stage	Formation of Terrace 4 (T4) of about 30-40 feet Terminal moraines deposited at a height of 8000-9000 feet	
Upper Pleistocene	III Interglacial Stage	Deposition of loess Formation of Terrace 3 (T3) of about 100-250 feet Erosion of earlier deposits	Tilting slightly
Upper Pleistocene	III Glacial Stage	Formation of Terrace 2 (T2) of about 100-200 feet. Terminal moraines deposited at 6800-9000 feet and about 100 feet above the 2nd glacial gravel fans	Tilting slightly
Middle Pleistocene	II Interglacial Stage	Formation of Terrace 1 (T1) of about 150-300 feet Erosion of Upper Karewas Upper Karewas formed which at lower levels are lacustrine but at upper levels have fluvial outwash (partly verved) being aeolian and fluvial in origin	Lake drains Tilting slightly
Middle Pleistocene	II Glacial Stage	Glacio-fluvial outwash, fans deposited 400 feet of karewa gravel deposited Karewa building continue Boulder conglomerates and boulder clay as glacial deposits Moraines deposited at a height of 5500-8000 feet	Tilting slightly
Lower Pleistocene	I Interglacial Stage	Lake bed with fluvial in wash and aeolian drift About 2000 feet of Lower Karewas deposited	Folding and tilting
Lower Pleistocene	I Glacial Stage	Conglomerates as outwash formed Deposition of thick gravel fans of about 200 feet Terminal moraines deposited at 5500 feet	

Compiled on the basis of the work of Hellmut de Terra and Paterson 1939, Washington.

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In spite of the III and the IV Glacial stage deposited terminal moraines, a series of terraces were formed on account of erosion and deposition by the river tributaries during this time. Table IV exhibits the information regarding their formation at different stages.

Table IV (Bottom to Top)

Terrace No.	Period of formation	Causes underlying the formation	Distinguishing features
T5	Post-Glacial Stage*	Erosion of earlier terrace caused by the release of more melted water of glaciers in the streams	Composed of brown loamy (loess) silt. Placed 20-30 feet below the T4.
T4	IV Glacial Stage	Deposition of glacial debris brought down by the advancement of glaciers.	Composed of loamy silts derived from weathered and re-deposited loess as the glacial wash Placed 40-50 feet above the present stream line.
T3	III Interglacial Stage	Erosion of earlier deposition of T2 caused by the release of more melted water from the glaciers.	Corresponding to the other it is having great width and has cut the moraines of III Glaciation stage upstream.
T2	III Glacial Stage	Deposition of glacial debris on account of advancement of glaciers.	Presence of terminal moraines in the terraces.
T1	II Interglacial Stage	Erosion of existing level formations due to the fall in the water level on account of drainage of the lake.	Soft silts of karewas dissected and exposing underlying gravel fans.

Compiled on the basis of work of Hellmut de Terra and T.T. Paterson, 1939, Washington

* It is the beginning of Holocene period which is generally dated around 10,000 BC.

The terraces were shaped mainly due to the glacial oriented aggradation and degradation. In case of aggradation, the advanced ice sheets brought down all available debris (of sorts) and deposited it during their movement upon their frontal snouts. On the other hand, degradation was caused by the corresponding rise in water level of the

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streams during inter-glacial stages thereby cutting down the raised beds, so formed during glacial stages, of the streams. These terraces mainly consist of debris material of glaciers, including silts, gravel, fluvial wash and stream-rolled material. As is known from their chronological framework of sediments, de Terra and Paterson encompass the entire episode of glaciation in the Pleistocene epoch in which karewas were built from the Lower to the Middle Pleistocene epoch precisely between the end of I Glacial to the end of II Interglacial stages whereas terraces were cut thereafter to the beginning of the Holocene period.

The climatic sequence was seemingly modelled on the four fold glaciations of the Alps, represented there by Gunz, Mindel, Riss and Wurm, in the belief that all these features were present during the last one million years, and identified in other regions as far afield as East Africa and North America. This model is now being questioned and scholars have provided evidence of seventeen glaciations in North America for the last 1.7 million years (MY)[23]. On the other hand, in the neighbourhood of Kashmir, Porter recorded only three glacial periods of the Pleistocene epoch in Swat Kohistan (Pakistan).[24]

Can we, therefore, infer from these diverse records regional patterns in the world of glaciation? Even though presently the scientific record of the palaeoclimate of Kashmir is not as complete as one would like it to be, yet there are indications that Kashmir had a glacial stage in the Pliocene epoch as well.[25] Given the fact what is eventually put in place of de Terra and Paterson's model of sequence is at present impossible to predict accurately. It would be pertinent to ask, of the

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23 The evidence based on ocean–floor sediments of the Pacific was presented by N. J. Shackleton and N. D. Opdyke, 'Oxygen–Isotope and Palaeomegnetic stratigraphy of the Pacific core v 28-239, Late Pliocene to latest Pleistocene', *Geological Society of America Memorial*, Vol. 145, 1976, pp. 449-64; cf. R. W. Dennell, 'The Potwar plateau and studies of early man', *South Asian Archaeology*, 1981, (1984) p. 10.

24 S.C. Porter, 'Quaternary glacial record in Swat Kohistan, West Pakistan', *Bulletin of Geological Society of America*, No.81, 1970, pp. 421-46. He, however, has not identified any interglacial stage in between, instead separated from each other by interstadial periods which like interglacial periods were warm but of shorter duration, with fluctuations.

25 See infra sub heading, Palaeoclimate.

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four glacial periods, as recorded by de Terra and Paterson, which one falls in the Pliocene epoch. The chronological framework of glacial sequence is, therefore, open to debate.

Following the finding of the records of glaciations in the superficial sediments during the Pliocene epoch obviously not only the glacial frame work but also the time period involved in the formation of the karewas proposed by the Yale-Cambridge explorers needs a revision. An attempt, in this behalf, was made by a field geologist, D. K. Bhat, who revised their stratigraphical placement in relation to the Siwaliks[26] , as produced in the table V.

Table V (Bottom to top)

Age		Siwalik Stratigraphy		Karewa Stratigraphy	
Holocene		Post Siwalik		Post Karewa	
Pleistocene	Upper				
Pleistocene	Middle	Upper Siwalik	Boulder Conglomerate	Karewa Group	Nagum* Formation
Pleistocene	Lower	Upper Siwalik	Pinjore	Karewa Group	Hirpur** Formation
Pliocene	Late	Upper Siwalik	Tatrot	Karewa Group	Hirpur** Formation
Pliocene	Early	Middle Siwalik	Dhok Pathan	Karewa Group	Hirpur** Formation
Basement Rock					

Source: Dr. D. K. Bhat, 1982, New Delhi, Table 1, p. 49

* Nagum Formation is composed of Loess and Upper Karewa.
** Hirpur Formation is Lower Karewa.
---- Denotes unconformity.

26 D. K. Bhat, 'A review of the stratigraphy of the Karewa group (Pliocene - Quaternary), Kashmir ' *Man and Environment*, Vol. VI, 1982, pp.46-55.

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The stratigraphy and chronometry presented by Bhat stresses the point that the major portion of the Lower Karewas took shape in the Pliocene epoch and the remainder was built in the early Pleistocene epoch; whereas the entire Upper Karewas were built in the Middle Pleistocene epoch. In other words, Dr. Bhat's model indicates that the glacial sequence in Kashmir not only pertained to the Pleistocene epoch but the Pliocene epoch as well. Accordingly he equates the formation of the earliest part of the Lower Karewa with that of Dhok Pathan and Tatrot beds of the Siwaliks, which as per his evaluations were laid during the Early and the Late Pliocene epochs respectively and thus this stratigraphical lay-out contradicts the one put forth by de Terra and Paterson. Bhat has also placed the first three terraces of Kashmir (T1 to T3) in the Middle Pleistocene and last two terraces (T4 and T5) in the Upper Pleistocene epoch as against de Terra and Paterson's placement of only the first two terraces (T1 and T2) in the Middle Pleistocene (Table III above).

The stratigraphical lay-out for the karewas proposed by Bhat is subject to further revision as a new model for the Siwaliks itself has been proposed by Rendell.[27] Helen Rendell, a British geomorphologist, has raised doubts about the very existence of alluvial terraces in the Potwar which were identified and connected by de Terra and Paterson with the corresponding scheme of terrace-formation in Kashmir. The five terrace formations of the alluvial sediments of the Potwar Plateau in the northern Punjab (Pakistan) were regarded by them to have been the off-shoot of the rise and fall in the water level of streams due to effects of the glaciations in the Kashmir Himalayas.[28] This relative chronology of the stratigraphical geo-morphological formations, as worked out by them, is given in the table VI.

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27 Infra table VII

28 Hellmut de Terra and T.T. Paterson, *Studies in the Ice Age.*

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Table VI (Bottom to top)				
Kashmir		*Glacial Period*	Potwar	
No. of Terrace	*Composition of Geological entity*		*No. of Terrace*	*Compassion of Geological entity*
T4	Terrace chiefly consist of (loess) loam	IV Glacial Stage	T4	Pink loam, silt, gravel
T3	Chiefly of weathered and redeposited (loess) loam	III Inter-glacial	T3	Thin loam
T2	Mainly having boulder gravel and terminal moraines	III Glacial	T2	Potwar loessic silt and gravel
T1	Soft silts of Upper Karewas and gravel fans	II Inter-glacial	T1	Upper Terrace gravel
--------	Uplift/tilting/ folding-------	----------	----------	Erosion / tilting/ folding
-	Lower Karewas with boulder conglomerates and terminal moraines	II Glacial	-	Boulder conglomerate beds
----------	Folding/tilting--------	------	----------	Erosion/ tilting/ folding
-	Lower Karewas deposited having fluvial inwash and aeolian drift	I Inter-glacial	-	Pink silt and sand on Pinjore beds
-	Terminal moraines and conglomerate bed	I Glacial	-	Conglomerate and sands on Tatrot bed.
	Basement rock	Pre-Glacial stage	-	Dhok Pathan formation

------- Denotes unconformity.

Compiled on the basis of the work of Hellmut de Terra and T. T. Paterson, 1939, Washington.

Helmut de Terra and Paterson correlated the outwash of the II Glaciation with the Potwar Boulder Conglomerate and assigned Dhok Pathan beds to the Pliocene and Tatrot to the Lower Pleistocene as

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Elephas and *Equas*[29] appeared first in the Tatrot beds. They also understood that terrace formation, both in Kashmir and the Potwar, got completed on account of glaciation depositions and erosions from II Glacial period onwards.

Helen Rendell on the other hand has emphasized the significance of tectonic upliftments of the Siwalik sediments for their morphological formations. Therefore, she rejects outright the morphological characters and the outlying cause of five terrace formation in the Potwar plateau and believed that a definite stage of geological formation of horizontal layers, called Lei-conglomerate complex, was formed. This massive complex of pebbles, cobbles and boulders, chiefly of limestone's, offering considerable resistance to erosion and cutting down by rivers in the plateau, tends to appear as residual shelves or benches on the valley slopes which are, what de Terra and Paterson took to represent one or more terraces[30].

What this reinterpretation of the sediments leads to be is that the role played by the erosion was not as dominant as believed earlier. In other words she has questioned the application of the earlier model in the Potwar for the terrace formations and as such puts the theory of terrace formations in Kashmir as well in a state of fix and accordingly no stress has been made in this work to correlate the terrace chronology with any kind of archaeological associations that de Terra and Paterson recorded earlier[31]. She presented a modified relative chronology, as reproduced in the table VII, of the Potwar plateau:

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29 Hellmut de Terra and T.T. Paterson regarded this fauna, also called *villa franchian*, to demarcate the Pliocene from the Pleistocene as was held by F. E. Zeuner, *Pleistocene Period*, London, 1959

30 Helen Rendell, 'The Pleistocene sequence in the Son Valley, northern Pakistan', *'South Asian Archaeology* , 1981, (1984), pp 3-9.

31 Hellmut de Terra and T. T. Paterson, *Studies in Ice Age.*

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Table VII (Bottom to top)			
Geological deposition			**Tentative dates in BP**
-------Erosion/deposition ----------			
-------Loess deposition		0-08 Mts.	18,000 *
------ erosion/deposition ----------			40,000
Loess deposition			65,000 **
Lei-conglomerate complex		105 Mts.,	
Includes deposition of loess			
-------Uplifting/folding/start of erosion ----			700,000 to 500,000
-------Unconformity ----------			1.6 MY
Siwalik Group	Upper Siwalik conglomerate	900 Mts.	1.9 MY
	Pinjore beds	107 Mts.	
	Tarot beds		
	---------- disconformity ----------		3.0 MY
	Dhok Pathan	400 Mts.	8.0 MY
	Nagri formation	66.5 Mts.	
	Chinji formation	1525 Mts.	10.2 MY

Table source: Helen Rendell, 1981, Cambridge.

* and ** dates are estimated on the basis of the T.L. technique by Helen Rendell and are reported in 'Environmental Changes during the Pleistocene in the Potwar plateau and Peshawar Basin, Northern Pakistan' in *Palaeoclimatic and Palaeoenvironmental Changes in Asia.*

Helen has thus not only radically changed our view of the stratigraphy of the geological formations in the Potwar plateau from that of de Terra and Paterson, but has also shown that the formations overlying the Upper Siwaliks, taken earlier to be river terraces, even though laid by rivers, streams and torrents out of mountains into the plains, were subsequently folded as a result of tectonic events and re-laid in perpendicular or near perpendicular positions.[32] It seems that

[32] Since 1980, interdisciplinary teams comprising British Archaeological Mission to Pakistan, Department of Archaeology of Pakistan, and Geological Survey of Pakistan besides a joint Pak-America team are working on the Siwaliks in Pakistan. Some of their findings have been published by B. Allchin, 'Earliest traces of man in Potwar Plateau, Pakistan- a report of British Archaeological

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de Terra and Paterson underestimated the significance of tectonic upliftments in the stability of the sediments. What is to be seen is whether this criterion can be applied to the terrace formations, so identified and related by de Terra and Paterson, in Kashmir and how for tectonic upliftments have played their role in such formations in the Valley.

Rendell is again at cross roads with de Terra and Paterson in terms of time involved in the formation of this variety of geological entities. She dated the Lei-conglomerate and the Upper Siwalik conglomerate (terraces T1 to T3 and boulder conglomerate of de Terra and Paterson) complexes from 500,000 BP to 1.9 MY BP (Pleistocene age) and has deduced the age for the Pinjore beds to 2.5 MY BP (Pliocene age). Contrary to this, de Terra and Paterson had attributed the age of the Pleistocene epoch for all these entities together.[33]

At the time Rendell was studying afresh the Potwar formations, a multidisciplinary study, with the help of modern scientific tools, was undertaken in Kashmir to study the formation of morphological entities, climatic oscillations, faunal records, etc so that one is able to arrive on logical conclusions regarding their realities[34]. The researches

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Mission', *South Asian Studies*, Vol.2 1986, pp 69-83 ; R.W. Dennell, *op.cit.*, Helen Rendell, *op.cit.*, Helen Rendell and R.W. Dennell, 'Dated Lower Palaeolithic artifacts from northern Pakistan, *Current Anthropology*, Vol.26, No.3, Chicago 1985, p.393; and Helen Rendell, 'Environmental changes during the Pleistocene in the Potwar plateau and Peshawar Basin, Pakistan', *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, pp.58-66.

33 Hellmut de Terra and T. T. Paterson, *Studies in Ice Age*. The model proposed by Dr. D. K. Bhat, supra table V, in respect of Siwalik stratigraphy related with Kashmir sediments, seems erroneous in many respects on the basis of the chronometric dates estimated by Rendell, supra table VII; as neither Dhok Pathan can be related with the Lower Karewas nor boulder conglomerate with the Upper Karewas.

34 A multi-dimensional research on palaeoclimate, geophysical formation, associated flora and fauna of Kashmir under the banner of *Kashmir Palaeoclimatic Project* was undertaken from 1980 to 1989 by the researchers of National Physical Research Laboratory, Ahmedabad, Geological Survey of India, Birbal Sahni Institute of Palaeobotany, Lucknow, Universities of Delhi, Garhwal, Gujarat, Kashmir, Lucknow and Punjab. Many of its findings have been published separately in various journals, but the consolidated findings have appeared in *Man and Environment*, Vol. VI, 1982; *Climate and Geology of Kashmir and Central Asia the last 4*

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have shown that the Kashmir basin turned into a vast lake on account of a tectonic related upheaval of the Pir Panjal range. This rise, by about 1700 to 3000 meters, in the south and south-west of Kashmir started around 4 MY BP.[35] On account of the upheaval, the natural drainage enrouting south Kashmir,[36] which would have run parallel to the longitudinal axis of the present day river Chinab, was impeded.

Consequently the basin became the recipient of highland waters without any outlet which brought in all kinds of sediments that accumulated mostly near the drainage basins. Another major tectonic upheaval, assigned to around 200,000 years BP[37], in the Pir Panjal range

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Million years, New Delhi, 1985; *Palaeoclimatic and Palaeoenvironmental Changes in Asia during the last 4 million years*, New Delhi, 1988; and D. P. Agrawal, *Man and Environment in India through the Ages*, New Delhi, 1992.

35 Magnetostratigraphy and fission track dating marks the event around 3.5 MY BP, Sheela Kusumgar, D. P. Agrawal and S. B. Kotlia, 'Magnetostratigraphy of the Karewas', *Climate and Geology of Kashmir and Central Asia: the last 4 MY BP*, New Delhi, 1985. However, the pollen sequence of the earliest levels of the Lower Karewas from Dubjan locality in the Rembiara river valley pushes the date to around 3.8 MY BP, R. Dodia, D. P. Agrawal and A. B. Vora, 'New Pollen data from the Kashmir bogs: a summary, *The Evolution of the East Asian Environment*, ed. R. D. Whyte, Vol. 2, 1984, p. 659 and as such the Pir Panjal rise may have started some time around 4 MY BP.

36 The lithologic and palaeocurrent changes that are observed in the Jehlum re-entrant around 4-5 MY BP are the direct reflection of the south-ward relocation of the basal thrust front and the initial elevation of the Pir Panjal range. On account of this the natural drainage system got blocked, D. W. Burbank and R. G. H. Reynolds, 'Sequential lake Cenozoic structural disruption of the northern Himalayan fore-deep', *Nature*, Vol. 31, 1984, p. 144.

37 It was earlier estimated that this event took place around 3, 50,000 BP, A Bronger, R. K. Pant and A. Sanghvi, 'Pleistocene changes and landscape evolution in the Kashmir basin: Palaeopedologic and Chronostratigraphic Studies', *Quarterly Research*, Vol. 27, 1987, P. 167. However, as the loess profile at the earliest levels on the south-south west is of around 2,00,000 BP to mark the event accordingly, S. K. Gupta, 'Recent Palaeoclimatic data from Indian Region' *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, p. 14. It is further authenticated by the pollen record pertaining to the Romshui river dated back to 2, 00,000 BP demarcating the end of the lacustrine deposits on that south side of the valley, R. Dodia, 'Climate of Kashmir during the last 7,00,000 years: the Baltal pollen profile' *Palaeoclimatic* and *Palaeoenvironmental Changes in Asia*, p. 153 and as such the second rise in the Pir Panjal could not have been much older than 3,00,000 BP.

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led to a further rise in its height. As a consequence, the basin or lake floor tilted towards the north and north-east exposing thereby all the sediments accumulated on the south and south west of the basin.[38] Thereafter the exposed sediments, called karewas, got overlaid by a new deposition and accumulation of wind-borne loess.[39] Hereafter the lake continued to exist but in a shifted position, and as such the sediments on the north and north-west continued being accumulated and were exposed only when the lake drained out through the Baramulla fault. This happened as a result of the breach around 85,000 years BP; dated on the basis of the earliest loess deposition on the northern side[40], further giving rise to the present-day river channel of

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38 Palaeogeographically, the extended lake continued to occupy the whole of the basin floor from around 4 MY to 200,000 B P when it shifted roughly towards north of about 33⁰ 55′ N, D. P. Agrawal, N. Juyal, P. Sharma, R. Gardner and Helen Rendell, 'Palaeogeography of the loess deposits of Kashmir', *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, p. 57, thus exposing major portion of the Karewa beds on the south and south-west.

39 Loess deposits are found in many parts of the world, the thickest being in China and Central Asia. Its origin is generally traced in the glacial abrasion, aeolian abrasion and salt weathering. Regarding China it is, however, believed that it is a wind-borne deposit of silt derived from deflation of surfacial rocks of deserts and arid areas of the north western China, D. P. Agrawal, N. Juyal, P. Sharma, R. Gardner and Helen Rendell, 'Palaeogeography of the loess deposit of Kashmir', *Palaeoclimatic and Palaeoenvironmental Changes in Asia*. pp. 51-57.
In the maximum deposit of twenty meters of loess on the Pir Panjal side the concentration of iron and titanium together with ilmenite is relatively high than that of ten meter deposit of loess on the Himalayan flank. The reason being that the Pir Panjal range is dominated by the basic igneous rocks and has high concentration of ilmenite whereas the Himalayan flank is made up of limestone which generally has lower concentration of titanium. Thus it appears that the source material for loess deposits in Kashmir was derived from the nearby rocks in the periglacial environment and not transported into from far off distances, G. S. Lodha, K.J.S. Swahney, H. Razdan, D. P. Agrawal and N. Juyal, 'Characterization of loess–palaeosol sequence in Kashmir valley using multielemental concentration data', *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, pp. 31-45.

40 D. P. Agrawal, N. Juyal, P. Sharma, R. Gardner and Helen Rendell, 'Palaeogeography of the loess deposits of Kashmir', *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, p. 56.

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the Jehlum, which remains the only channel of the drainage of the Kashmir. The wind-borne loess continued to accumulate on all the exposed karewa tops till the end of the glaciation approaching the Holocene.

The studies have, therefore, shown that the Pliocene-Pleistocene accumulations can be categorized into three parts: the top-most member of loess is followed either by the Upper Karewas or the Lower Karewas as the case may be at a given place. All these superficial geological entities are also chronometrically dated as all the lake sediments which accumulated together before the 2nd upheaval of the Pir Panjal or between 4 MY BP to 200,000 BP, are the Lower Karewas and the lake sediments which accumulated from 2,00,000 BP to 85,000 BP are the Upper Karewas.[41] The loess member on the sediments is variedly deposited on the two sides of the Valley. On the south and south-west of Kashmir it was deposited on top of the Lower Karewas from around 2,00,000 years BP, whereas the loess on the north and north-east was deposited from 85,000 years BP on the Upper Karewa beds.

Following the shifting of the lake towards the northern flank of the Himalayas the loess member is about twenty meters thick on the south and south-west whereas the north and north-east it is only ten meters thick and thus 85,000 years younger than the earliest accumulation on the south and south-west side.[42] The radical and stupendous changes starting in the Pliocene, around 4 MY BP, have left

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41 D. P. Agrawal, N. Juyal, P. Sharma, R. Gardner and Helen Rendell, 'Palaeogeography of the loess deposit of Kashmir', *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, p. 56. Earlier these members were differentiated on the basis of sedimentology (Lydekker, supra note 8). Hellmut de Terra and Paterson differentiated the Upper Karewas from that of the Lower Karewas on the basis of the record of 2nd upheaval of the Pir Panjal in these sediments, *Studies in the Ice Age*. These were even differentiated on the basis of their location, like Hirpur Formation and Nagum Formation, Dr. D. K. Bhat, 'A Review of the stratigraphy of the Karewa group (Pliocene-Quaternary) Kashmir', *Man and Environment*, Vol. VI, 1982, pp. 46,55.

42 D. P. Agrawal, N. Juyal, P. Sharma, R. Gardner and Helen Rendell, 'Palaeogeography of the loess deposits of Kashmir', *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, p. 55.

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behind about 1.2 km. thick superficial geological deposit[43] in which loess accumulation terminated after around 15,000 years BP.[44]

Palaeoclimate:

The present day climate is without any major summer monsoons that are found in most of the Indian sub-continent bringing heavy annual summer rains. Kashmir receives only winter precipitations in the form of excessive rains and snow in association with cold and chill, on account of the Mediterranean winter winds. The summer climate is set by the present height of the Pir Panjal (14,000 feet above sea level) that shields the Valley from the heat and monsoons coming from the south west of the Indian sub-continent. Accordingly temperate climate exists through out the summer in the Valley.

Palaeoclimate of Kashmir was constructed on the basis of the relics left behind in the geomorphological sediments mostly represented by the glacial happenings. Now a varied data is at hand that gives broad glimpses of the happenings. Accordingly it is known that before the rise of the Pir Panjal range to the present height Kashmir like the Indian plains had a sub-tropical type of climate in the Pliocene epoch. It is what the climatic data of the last four million years shows. The data based on pollen material, reproduced in the table IX, shows that the climate in the past has recorded a series of periodic changes that finally settled to the present pleasant one.

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42 R. Dodia, 'Climate of Kashmir during last 7,00,000 years: the Baltal pollen profile' *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, p. 150. Earlier de Terra and Paterson estimated that a maximum of 800 meters of the Lower Karewas is certainly preserved and almost an equal amount of thickness of those were eroded, *Studies in the Ice Age.*

44 The last palaeosol at the top of loess member is dated around this time, S. Kusumgar, D. P. Agrawal, N. Juyal and P. Sharma, 'Palaeosols within loess: Dating Palaeoclimatic events in Kashmir', *Radiocarbon*; Vol. 28. 2A, 1986, pp. 561-65.

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Table VIII

Age in MY BP	Site	Pollen Zone	Climate
0.2	Romu	Loess	Barren :Gap
0.6 to0.3	Romu	B-9	Cold and dry
		B-8	Cold and dry
		B-7	Cold and dry
	Baltal	B-6	Cool, temperate, wet
		B-5	Cold and dry
		B-4	Cool, temperature, wet
		B-3	Cold and dry
		B-2	Cool, temperature, wet
		B-1	Cool, moderate, wet
0.7 to0.6	Sarnar		Cool, temperate
2.2 to0.7			Gap
2.4 to2.2	Krachipatra	KP-1 to KP -4	Upper part incomplete, cold temperate with little variation in precipitation.
2.6 to2.4			Gap
3.7 to2.63	Hirpur	H-15	Cold, temperate, dry
		H-14	Cold, temperate, less dry
		H-13	Cold, temperate, moist
		H-12	Temperate, humid
		H-11	Warm, temperate, moist
		H-10	Sub-tropical, warm
		H-9C	Sub tropical dry
		H-9B	Temperate and dry
		H-9A	Sub tropical dry.
		H-8	Warm temperate wet
		H-7	Sub tropical dry
		H-6	Cool temperate
		H-5	Sub tropical dry
		H-4	Warm temperate dry
		H-3	Sub tropical moderately dry
		H-2	Warm temperate dry
		H-1	Sub tropical dry
3.8 to3.7			Gap
>3.8	Dubjan	DB-3	Cool, temperate, wet
		DB-2	Warm temperate, less wet
		DB-2B	Increasingly warm temp
		DB-2A	Warm temperate transition
		DB-1	Warm temperate moderate

Source, D P Agrawal, 1992, Delhi

The data has given for the first time a scientific view about the climatic conditions prevailing in the Pliocene-Pleistocene period. To begin with there was a warm sub-tropical climate around 4 MY BP. Thereafter the climate registered a series of changes from sub-tropical to cool temperate till about 2.6 MY BP. Around this date was the first positive indication of an ensuing cold and dry climate. This glacial

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climatic situation lasted almost till around 2.0 MY BP. Besides pollen data, stable isotope evidence[45] also show that the period witnessed cold-dry climate. In addition, the faunal data of microtine rodents, *arvicolid* which are indicative of cold glacial climate, were reported from three horizons of karewas, and the earlier of these dated 2.4 MY BP[46] attest that this Pliocene stage was having glacial climate.

It is significant that this pre-Pleistocene cold-dry glacial period was spread over thousands of years. The Pliocene glaciation may, therefore, represent the I Glacial stage that was estimated earlier to have occurred in the Pleistocene. However, the remaining three stages of the sequence are not accurately placed from the new palaeoclimatic data. This is primarily because that for a considerable period of time to fallow the pollen record is not available from the karewas. The sediments being alkaline in nature have not preserved the pollens to define the climatic behaviour that was in place in Kashmir between 2 MY and 700,000 BP.

This long geological period is represented by the Lower and Middle Pleistocene where de Terra and Paterson had placed the first two of their four-fold glacial periods. Once the so-called I Glacial stage has occurred in the Pliocene itself, lasting for about 500,000 to 600,000 years, can the remainder be placed rationally?

Considering that each of these ice age periods lasted similarly for more or less the same period of 500,000 to 600,000 years the so called II and III Glacial stages may therefore fall between 2 MY to 700,000 BP, for which we have no pollen data. However the rodent record of *arvicolids* found from the karewas indicates that certainly the

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45 R.V. Krishnamurthy, M.J.De Niro and R.K. Pant, 'Isotope evidence for Pleistocene climatic changes in Kashmir ', *Nature*, Vol. 298, 1983, p.690.

46 A Sahni and B.S. Kotlia, report fossil rodents called from the Lower Karewa horizons, pertaining to the Pliocene epoch, 'Karewa micro vertebrates: biostratigraphical and palaeoecological amplifications', *Climate and Geology of Kashmir* , p. 27; S. B. Kotlia, 'Vertebrate fossils in the Palaeoenvironment of the Karewa *intermonte* basin, Kashmir' *Current Science*, Vol. 54, 1985, pp. 1275-77 and 'Quaternary rodent fauna of the Kashmir Valley: Systematic biochronology and palaeoecology' *Journal of Palaeontological Society of India*, Vol. 30, 1985, pp. 81-91; D. P. Agrawal, *Man and Environment in India*, pp. 116-18.

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cold glacial climate necessary for their growth was in existence around 1.8 to 1.6 MY BP[47]. In other words we are sure that the next cold stage was in existence at this point of time and was therefore the first glacial stage of the Pleistocene and second in the sequence representing the so called II Glacial stage. No more evidence of the glacial rodents has been found, from the sediments immediately following the above, to give any reason to believe how long the stage lasted or when the so called III Glacial stage started.

In the period to follow, that is from 700, 000 onwards, many cold-dry climatic situations have been recorded. The *arvicolids* record of 400,000 BP[48] and the pollen record of 700,000 to 200,000 BP show that there were very long and cold glacial climatic situations. It had three long cold and dry spells, interrupted by spells of warm climate representing either interstadial or interglacial periods.[49] Spread over about 500,000 years the pollen diagram shows five cold periods separated by warm periods and hence Agrawal has called them five glacial periods separated by interglacial periods[50]. On the other hand Rekha Dodia argued that these five cold periods were separated by interstadial stages[51].

In fact this pollen diagram, of the Romu locality, shows that the last three cold periods were actually without any break (table VIII supra) and can thus be treated as one constituent unit. This cold situation was preceded by a warm-cold-warm-cold sequence and hence together they make the three cold glacial situations interrupted by two warm situations. The question therefore remains whether this climatic

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47 *Current Science*, Vol. 54, 1985, pp. 1275-77; *Man and Environment in India*, pp. 116-18.

48 S. B. Kotlia, 'Vertebrate fossils in the Palaeoenvironment of the Karewa *intermonte* basin, Kashmir', *Current Science*, Vol. 54, 1985, pp. 1275-77; 'Quaternary rodent fauna of the Kashmir Valley: Systematic biochronology and palaeoecology' *Journal of Palaeonotological Society of India*, Vol. 30, 1985, pp. 81-91; *Man and Environment in India*, pp. 116-18.

49 Each interglacial period is taken to have lasted for about ten thousand years or so, D.P. Agrawal, *Man and Environment in India*, p.59.

50 D. P. Agrawal. 'Palaeoclimatic data from Kashmir: A synthesis and some correlation', *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, p 53

51 R. Dodia, 'Climate of Kashmir: the Baltal pollen profile', *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, p 156.

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presence of 500,000 years represents the so called IV Glacial stage in which there were two pulsations of warm periods to be called interstadial.

Hellmut de Terra and Paterson while making their estimations had observed that each Glacial stage saw inter-glacial pulsation of the ice front, more evident in the late stages and thus they recognised at least two advances during II Glacial stage, four advances and a retreat halt in the III and four advances in the IV, caused by climatic oscillations. They could not estimate the duration of these variations as the size of glaciers was itself rather difficult to measure. Paterson, however, said that if the size of moraines be taken as a standard for determining the duration of a particular type of climate then II Glaciation period was larger than I Glacial period which was itself longer than III Glacial period and the III period was longer than the IV Glacial period. The observance of the climatic oscillations during the glacial stages, particularly during the late stages,[52] was also recorded in the pollen profile.

What the estimations and the evidence suggest is that there existed climatic fluctuations where cold stages were interrupted by more suitable warm ones. Such fluctuating climatic conditions[53] gave rise to the formation of the palaeosols in the loess, which at several stages of its deposition became transformed into weathered soils during warm and humid conditions following a cold and arid spell.[54] Out of ten such palaeosols in the loess found at various depths, three

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52 Hellmut de Terra and T. T. Paterson, *Studies in the Ice Age..*

53 Beyond 2,00,000 BP the pollen data from Upper Karewas and loess sediments is not available as these sediments being alkaline in nature are sterile in pollen, D.P. Agrawal, 'Palaeoclimatic data from Kashmir: A synthesis and some correlation's', *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, p. 6.

54 The Palaeosols within the loess have developed during various stages of weathering, in the periods of climatic amelioration, from cold arid to temperate humid. These generally contain humus rich horizon, 'A', followed by a clay rich compact horizon, 'B' with low calcium carbonate ($CACO_3$) content and a carbonate illuvial horizon with high $CACO_3$ content, G. S. Lodha, K. J. S. Swahney, H. Razdan, D. P. Agrawal and N. Juyal, 'Characterization of Loess-Palaeosol sequence in Kashmir Valley using multi-elemental concentration data', *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, pp.33-34.

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show relatively greater weathering and thus reflect warmer and more humid conditions prevailing during their formation.[55] The thermoluminescene (TL) dating has provided a date of around 15,000 BP for the latest palaeosol formation.[56] The results drawn from the TL dating of the loess sediments of the palaeosols provide a broad spectrum of information regarding the climatic changes which the Valley experienced during the period from 30,000 to about 15,000 BP[57].

However, on an average the loess has recorded such changes after every 20,000 years[58] and each change was characterised by a set trend seeking to improve the climatic conditions from cold to warm-humid period. The period between 30,000 to 15,000 BP exemplifies the above trend besides providing testimony of the climatic change from a cold to warm period[59] – a reality which is further reinforced by the available pollen record.

The pollen record from the bogs of Kashmir suggests that the climate was relatively warm in and around 17,000 BP,[60] a period universally known for glacial maximum.[61] Inter alia, Kashmir

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55 D. P. Agrawal, *Man and Environment in India through Ages*, p. 262.

56 Helen Rendell and P. D. Townshed, 'Thermoluminescene dating of Kashmir Loess', *Palaeoclimatic and Palaeo-environmental Changes in Asia*, p. 49. They however, report some inherent limitations in the technique employed for the dating in excess of 80,000 years.

57 Helen Rendell and P. D. Townshed, *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, p.49.

58 Helen Rendell and P. D. Townshed, *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, p.49; D. P. Agrawal, 'Palaeoclimatic data from Kashmir: A synthesis and some correlations', *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, p.6.

59 Carbon dated palaeosols, 30,000 BP and above, were reported by S. Kusumgar, D. P. Agrawal, N. Juyal and P. Sharma, 'Palaeosols within loess: dating Palaeoclimatic events in Kashmir, *Radiocarbon*, Vol. 28.2A, 1986, pp. 561-65.

60 Rekha Dodia, D. P. Agrawal and A. B. Vora, 'New pollen data from the Kashmir Bogs: a summary', *The Evolution of the East Asian Environment'* ed. R. D. Whyte, Vol. 2, Hong Kong, 1984, pp. 569-78.

61 D. P. Agrawal, 'Palaeoclimatic data from Kashmir: A synthesis some correlation's', *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, p. 6. In Nepal, as well, the pollen data suggest that warming up of the atmosphere had started there around 17,000 BP and that the last phase of glacial maximum was registered around 20,000 BP, Y. Igarashi, M. Yoshida and H. Tabata, 'History of vegetation and

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registered climatic amelioration which was sustained for a long period as is shown by an extensive palaeosol development at that time.[62] However, with the dawn of the Holocene period, i.e. around 12,000 BP, Kashmir was again overwhelmed by a spell of cold climate which was transformed into a relatively warmer ambience only towards the mid-Holocene period (7,000 BP).[63]

The pollen record and the loess palaeosols together point out the fact that the Upper Pleistocene severe cold glacial climate was interrupted by ten warm climatic situations. Again the question occurs whether the palaeosol formation represents an interglacial or interstadial condition. Whatever may be the case the overall climatic record available provides ample evidence of the cold glacial situations existing in the Pliocene-Pleistocene epochs that were interrupted by warm conditions of interstadials and interglacials to alter the conditions even though comparatively briefly.

Given the recent geological and palaeoclimatic investigations, both in and outside Kashmir, we can draw certain conclusions as are reflected on the table no IX (see on page 41). It provides a tentative chronology of geological material accumulated there during the Pliocene and the Pleistocene epochs when Kashmir witnessed glacial periods, whose number, however, is still to be accurately counted.

In this chronological table, we have matched the available chronometrical dates to those of the sediments that were earlier held to have been formed in the Pleistocene only, but many of these dates actually fall in the Pliocene. Most of these dates are in conformity with those of the chronometric dates deduced in the Potwar. Even though the sedimentological pattern is that of de Terra and Paterson, yet it differs in many respects, particularly when we do not lay emphasis on the formation of terraces.

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climatic changes in Asia', *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, pp. 212-25.

62 D. P. Agrawal, *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, p.7.

63 Rekha Dodia, D. P. Agrawal and A. B. Vora, *The Evolution of East Asian Environment*, p. 569.

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The line between the Pliocene and the Pleistocene epochs gets demarcated by the presence of boulder conglomerate III earlier found by de Terra and Paterson in the Lower Karewas of II Glaciation. As said above the I Glacial stage, as recorded by de Terra and the Paterson, had occurred in the Pliocene epoch and the remaining glacial stages occurred during the Pleistocene epoch. The II Interglacial stage of de Terra and Paterson was full of events, in which they estimated that the southern Lower Karewas were exposed, the northern Upper Karewas began to build up and Baramulla gorge later on emptied the prehistoric lake. However, all these events do not seem to have taken place during this Interglacial period alone.

Firstly because an Interglacial period is believed to have lasted only for about 10,000 years or so[64] whereas all these events took more than hundred thousand years, precisely from 2,00,000 to 85,000 BP. Secondly the climate of Kashmir around 2,00,000 BP was not warm as found during an interglacial period but intensely cold to rule out the possibility of the happenings occurring in the II Interglacial stage. The palaeosol formation in the loess clearly points out that the climate and environment had actually fluctuated more consistently rather being static for longer durations to influence the habitat and ecology.

Palaeovegetation:

We have no idea about the vegetational pattern available in Kashmir in the pre- and early Pliocene epochs[65]. As the land formation took place late, on account of the Himalayan building, the angiosperm plants could not get established there, as well as for the fact that the

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64 S.K.Gupta, 'Recent Palaeoclimatic data from India region with reference to climate modeling and environmental studies', *Palaeoclimatic and Palaeoenvironmental Changes in India*, pp 12-21.

65 In the beginning of the Paleocene epoch, 70 MY BP, there appeared on earth clear adaptive evolutionary superiority of modern plant forms, like grasses and flowering plants, called angiosperms, over mosses and ferns that had dominated throughout the dinosaurs reign from 225-75 MY BP, M. K. Nickels, *et al*, *Anthropology and Archaeology*, p. 168.

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sediments have been rigged up, compressed and elevated[66]. But there is ample evidence pertaining to the existence of warm loving forest plants, like oaks and laurels, growing during the Upper Pliocene epoch in Kashmir, around 3.8 to 2.6 MY BP.[67] Thereafter, as the fossils suggest, the flora comprised both warm loving oak plants and conifer plants. The warm loving plants mainly comprised *Quercus semecarpifolia, Quercus incana, Betula utilis* and *Populus nigra*.[68] The conifers broadly consisted of *Pinus excesla* and *Abies webbiana*, with the former in large quantities.[69] The growth of these conifers has mostly been traced in the upper areas while the lower areas specialized in the growth of evergreen and deciduous broad leaved oak species.[70]

Pollen record suggests a fluctuating trend in the growth of the above plant communities at different times. For example between 700,000 and 200,000 BP conifers like *Pinus wallichiana, Picea* and *Abies* competed among themselves with a noticeable successive rise or fall in the growth of one or the other genus. However, during the same period, conifers out-numbered the broad leaved plants like *Betula, Ulmas, Juglans, and Quercus* of the oak communities[71]. As the cold climatic conditions help the growth of conifers and the warmer conditions are suitable for the growth of oak trees, these, therefore, provide evidence that the period witnessed a prolonged spell of cold climate with comparatively shorter intervals of warmer conditions.

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66 The angiosperms invaded Kashmir very late as a secondary migration through Iran-Afghanistan, G. N. Javaid, *Flora of Srinagar*, unpublished Ph.D. thesis, University of Kashmir, Srinagar, 1970.

67 Rekha Dodia, D. P. Agrawal and A. B. Vora, *The Evolution of East Asian Environment*, p. 569; H. P. Gupta, C. Sharma, R. Dodia and C. Mandavia, 'Palynostratigraphy and palaeoenvironment of Kashmir, Hirpur location III', *Climate and Geology of Kashmir*, p. 27.

68 Rekha Dodia, D. P. Agrawal and A. B. Vora, *Climate and Geology of Kashmir*, p. 27; Vishnu-Mittre, 'Floristic and ecological reconsideration's of Pleistocene plant impressions from Kashmir, *The Palaeobotanist*, Vol. 16, No. 3&4, 1967, pp. 308-29.

69 Rekha Dodia, D. P. Agrawal and A. B. Vora, *The Evolution of East Asian Environment*, p. 569

70 Rekha Dodia, 'Climate of Kashmir during the last 700,000 years: the Baltal pollen profile' *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, pp. 149-157.

71 Rekha Dodia, *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, pp. 149-157.

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Because of the sterile condition of the sediments we have no pollen evidence which would suggest the type of the plant growth during the period from 200,000 to 17,000 BP. However, towards 17000 BP the oak trees outnumbered the conifer plants.[72] This trend lasted till around 12,000 BP when the last glacial activity waned and a new climatic transformation took place to provide conditions for the fall in the proportion of oaks, accompanied by the significant decline in the forests of elm trees[73] and substantial rise in the pollen profile of conifers.[74]

By the middle of the Holocene there was a marked decline in the number of pine forests, in this case not because of any appreciable change in the environment or climate but as a result of man induced deforestation. The process lead to the appearance of new plants like *Plantago lancelato* and a fair rise in chenopodiaceae, composite shrubs and light demanding trees such as elm and ash in the forests.[75] By about 5000 BP man was also responsible to induce the cultivation of cereal plants, like wheat and barley, in the Valley[76]. The appearance of grasses like *Plantago* and weeds like *Lithosperm arvense, Medicago denticulato, Medicago* spp., *Lotus corniculats* and *Ipomea* sp. indicate that the growth of the cereal plants had spread to forest lands as well by about 4000 BP[77].

The close struggle for survival and growth between warm and cold loving plants never meant that one particular community of plants

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72 R. Dodia, D. P. Agrawal and A. B. Vora, *The Evolution of East Asian Environment*, pp. 101-108

73 Vishnu-Mittre, 'Palaeobotanical evidence in India', *Evolutionary Studies in World Crops, Diversity and Change in the Indian sub-continent*, ed. Sir Joseph Hutchinson, Cambridge, 1974, pp. 3-30.

74 R. Dodia, D. P. Agrawal and A. B. Vora, *The Evolution of East Asian Environment*, pp. 101-108.

75 Vishnu-Mittre, *Evolutionary Studies in World Crops, Diversity and Change in the Indian sub-continent*, pp. 3-30.

76 G. M. Buth and R. N. Kaw, 'Plant husbandry in Neolithic Burzahom, Kashmir, *'Climate and Geology of Kashmir: The last 4 million years*, New Delhi, 1985, pp.109-110

77 Vishnu-Mittre, *Evolutionary Studies in World Crops, Diversity and Change in the Indian sub-continent*, pp. 3-30.

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was eliminated altogether at the cost of other communities in any given climatic conditions. Palaeobotanical studies indicate that both the cold and warm loving plants like *Pinus, Picea, Betula, Ulmas, Aesculas, Juglans, Baxus*, etc. coexisted around 5000 BP[78] and most of these plants still form the vegetation cover of the Valley.[79]

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[78] From the Neolithic levels at Burzahom were found the remains of *Pinus wallichiana, Picea smithiana, Cedrus deodara, Parrotioppis jacquemontiana, Qurecus sp., Betula utilis, Ulmas wallichiana, Celtis australis, Aesculus indica, Buxus sp., Juglans sp., Platanus orientalis, Fraxinus excelsior* and *Ficus* sp., Farooq A. Lone, Maqsooda Khan and G. M. Buth, "Five thousand years of vegetation changes in Kashmir, the Impact of Biotic Factor", *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, pp. 165-168 while at Gofkral the aceramic levels had *Pinus wallichiana*, the early Neolithic *Aesculus indica* and *Juglans regia* and the late Neolithic *Pinus wallichiana, Picea smithiana, Buxus wallichiana, Ulmus wallichiana* and *Prunus cornuta*, of which *Buxus* is said to have been acquired from outside as it does not grow there, *Indian Archaeology - A Review*, 1982-83, pp 175.

[79] The present day vegetation of Kashmir can be divided into three zones. Zone I (1500-2000 meters) has broad leaved and conifer elements. The broad leaved plants are poplar (*Populas ciliata, P. nigra*), walnut (*Juglans regia*) and elm (*Ulmus wallichiana*). The conifers are deodara (*Cedrus deodar*) and blue pine (*Pinus wallichiana*). In Zone II (2200-3200 Mts.) conifers totally outnumber the broad leaved elements. Elm is present up to 2700 meters. The main conifers are blue pine, fir (*Abies webbiana*), spruce (*Picea smithiana*) and yew (*Taxus baccata*). The majority of broad leaved trees are represented by *Pronus cornuta, Aesculus Indica, Acer caesium, Juglans regia, Rosa macrophylla*. Zone III (Above 3200 Mts) is the Alpine zone; vegetation begins with birch (*Betula utilis*) and above 3600 Mts. a variety of other vegetation occurs like Juniper (*Juniperus communis, J. squamata), Rhododendron companulatum, Salix denticulata, Syringa emodi and Lonicera spp.* This zone is also associated with meadows in which temperate grass species like *Poa, Glyceria* and *Festuca* are dominated, D. P. Agrawal, *Man and Environment in India*, p. 126. However the most common tree species found in Kashmir are:

English Name	Kashmiri Name	Botanical name
Deodar	*Deodar*	*Cedrus deodara*
Himalayan blue pine	*Kairu*	*Pinus wallichiana*
Himalayan silver fir	*Budal*	*Abies webbiana*
Yew	*Posthal*	*Texus baccata*
Elm	*Brenn*	*Ulmus wallichiana*
Walnut	*Dun*	*Juglans regia*
Italian poplar	*Phrast*	*Populas nigra*
White poplar	*Dudh phrast*	*Populas alba*
Maple	*Kanar*	*Acer* spp.
Willow	*Vir*	*Salix tetrasperma*

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Thus during the successive stages in the phytogeographical evolution, following the Upper Pliocene-Lower Pleistocene epochs, the vegetation cover of the Valley was transformed from sub-tropical oak-laural community to the present temperate pine-deodar-fir-cherry community on account of climatic alterations accompanied by changes in organic movement.

The vegetation cover obtaining now has not changed to any appreciable extent during the last five thousand years, except for changes induced by man. It was because of his disturbance of the natural vegetation, by clearing forests for the purpose of agriculture, timber, fuel wood and other forest products, and by his changing natural landscape into agriculturally useful land accompanied by the destruction of indigenous species to favour various economically useful species and introduction of exotics, that resulted in radical changes in the flora of the land during these years.[80] Otherwise the then environmental factors were similar to the present type.

Animal Paleontology:

During the last 120 years, a large collection of faunal information has been collected from Kashmir, but without any human palaeontological record. The extensive surveys of the karewas have exposed both invertebrate and vertebrate fossils.

The invertebrates found are molluscus and ostracods. Molluscus, mostly marine having soft unsegmented body protected by a

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White birch	*Burza*	*Betula utilis*
Plane	*Boin/Chinar*	*Platanus orientalis*
Juniper	-	*Junipers*
Horse chestnut	-	*Aesculus*
Water chestnut	-	*Trapa*
Oak	-	*Quercus*
Cat tail	-	*Typha*

Moonis Raza, A. Ahmad and Mohammad Ali, *The Valley of Kashmir*, New Delhi, 1978, Table XLVI.

80 Farooq A. Lone, Maqsooda Khan and G. M. Buth, 'Five thousand years of vegetational changes in Kashmir the Impact of Biotic Factor' *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, pp 165-168.

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calcareous shell, were first collected by Godwin-Austen[81] from Gogjipathri. Prasad identified some new types from the Upper and the Lower Karewas.[82] Thompson[83] and Cunningham[84] made collections of both fresh water and terrestrial molluscus from the karewas. Bhatia also collected some new types from the Upper and the Lower Karewas.[85] He also collected ostracods with 20 texas and 2 new species from the Upper Karewas.[86] A large collection of ostracods, from the Lower Karewas, for the first time gave a definite date of their appearance between 2.4 to 2.2 MY BP[87] indicating high marine life then as the lake conditions existed then.

The vertebrates are classified into two groups, smaller vertebrates and large vertebrates. The smaller vertebrates found so far in Kashmir are represented by fishes, insectivores and rodents. Fish remains from high altitudinal sediments were first reported from Gogjipathri, Yusmarg and Lidermarg.[88] Hora also found them from another high altitude place at Ningle Nallah, Gulmarg and identified

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81 Godwin-Austen, *op.cit*, 1864. The molluscus were studied and identified by Woodward as *Helix, Rupa, Zua, Succinea, Limnaea, Planorbis* and *Pisidium*.

82 B. Prasad, 'On a collection of land and fresh water molluscus from the Karewas of Kashmir', *Record of Geological Survey of India*, Vol. 56(4), 1925, pp. 356-361. He identified *Bithynia, Gyraulis* and *Planorbis* from the Lower Karewas and *Valvata piscinalis, Lymniaea auricularia, Pisidium hydaspicola* and *Planorbis planorbis* from the Upper Karewa.

83 Th. Thompson, *Western Himalaya and Tibet*, London, 1852.

84 A Canningham, *Ladakh - Physical, Statistical and Historical, with notices of the surrounding countries*, London, 1853.

85 S. B. Bhatia, 'Some Pleistocene molluscus from Kashmir', *Himalayan Geology*, Vol. 4, 1974, pp. 371-95 and identified a new species of *Gastropoda* from the Upper Karewas.

86 S. B. Bhatia, 'Some Pleistocene ostracods from the Upper Karewas of Kashmir', *Micropalaeontology*, Vol. 14(4) 1968, p. 465; and 'Some ostracods from the Lower Karewas near Nichahome, Kashmir', *Bulletin of Indian Geological Society*, Vol. 2(1&2), 1969, p. 69. The important ones are: *Cansoma, Cypria, Cyprinotus, Cypris, Ilyocypris, Limnocythere* and *Potamocypris* from the Upper Karewas and *Candona, Ilyocypris* and *Limnocythere* from the Lower Karewas.

87 D. P. Agrawal, *Man and Environment in India*, p. 120. The important ostracods are: *Candona fabaeiformis, C. havanaensis, C. kashmiriensis, C. lactea, C. marengoensis, C. neglecta, C. compressa, Cypris subglobosa, Cypris pubera*, etc.

88 Godwin - Austen, *op.cit*, 1864.

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them as *Orienus* and *Schizothroax*.[89] Later on, de Terra and Paterson[90] found fish remains from various other places, which were identified as *Schizothroax esocinus, Schizopygopsis, Diptychus, Orienus sinuatus, Cypris carpio communis* and *Cypris carpio scapularis*.[91] Kotlia collected some 6000 fossils of fish from different localities of the karewas, but no new specimens of any new genera or species were found.[92] What we know from these discoveries is that fish species like *Schizothroax esocinus* and *Cypris carpio communis* were found from the Lower Karewa horizons deposited during the prehistoric lake formation and are datable to around 3.9 MY BP; and these continued to appear in the karewas thereafter.[93]

The remains of insectivores were collected by Kotlia from Birnai Nallah at Keller[94] and are datable to 1.8 MY BP. Similarly microtine rodents, *arvicolids* were reported from three horizons of karewas datable to 2.4, 1.8 to 1.6 and 0.4 MY BP[95], indicating prevalence of cold glacial climate at these periods of time.

The karewas have also yielded a variety of fast moving large vertebrates. Hellmut de Terra and Paterson[96] and later on Wadia[97] found remains of *Bos, Felis, Elephas, Cervus, Shivatherium, Rhinoceros, Sus, Giraffe* and *Equas* from the Upper and the Lower Karewas. Likewise many of these animals were also located by Badam and

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89 S. L. Hora, 'On fossil fish remains from the Karewas of Kashmir', *Record of Geological Survey of India*, Vol. 72(2), 1937, pp. 178-87.

90 Hellmut de Terra and T. T. Paterson, *Studies in the Ice Age.*

91 S. L. Hora, *Record of Geological Survey of India*, Vol. 72(2), 1937, pp. 178-87.

92 B. S. Kotlia, *Vertebrate Palaeontology and Palaeoecology of the Karewas Group, Kashmir: A Bio-stratigraphical Study.* Ph.D. thesis submitted to the Punjab University, Chandigarh, 1984, c.f. D. P. Agrawal, *Man and Environment in India*, p. 116.

93 D. P. Agrawal, *Man and Environment in India*, p.102.

94 S. B. Kotlia, 'Vertebrate fossils in the Palaeoenvironment of the Karewa *intermonte* basin, Kashmir' *Current Science*, Vol. 54, 1985, pp. 1275-77.

95 S. B. Kotlia, *Ibid*; and 'Quaternary rodent fauna of the Kashmir Valley: Systematic biochronology and palaeoecology' *Journal of Palaeonotological Society of India*, Vol. 30, 1985, pp. 81-91; D. P. Agrawal, *Man and Environment in India*, pp. 116-18.

96 Hellmut de Terra and T. T. Paterson, *Studies in the Ice Age.*

97 D. N. Wadia, 'Pleistocene Ice Age deposits of Kashmir' *Proceeding of National Institute of Science*, India, Vol. &, No. 1, 1941, pp. 19-59.

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others.[98] It is now clear that the assignment of the Upper and the Lower Karewas to various geological times of earlier researchers is not quite accurately done therefore, on the basis of the fission track and magnetic dating of the karewa sediments the fossil record from these has given a new picture about them. Kotlia has evaluated the chronostratigraphic position of some of the faunal finds that were located during the Kashmir Palaeoclimatic Project to give an understanding of their appearance and existence at different periods of time. The remains mainly pertain to the following large animals.

Elephant: Elephant remains have been located from three localities, Wapzun, Romu and Somber. All belong to late horizons of the karewas of around 2,50,000 BP or later and are identified as *Elephas hysudricus*.[99] Recently, in September 2000, the fossil record of this animal was also located at Galander, near Somber from the Upper Karewa deposits. The fossil was embedded in a thick segment of sand deposit indicating that it lived at a time when the climate was glacial in character, and thus much less water was released as a result of which the streams deposited only sand horizons in the karewas. The animal seems to have rolled down from the upper reaches as its lower mandible remains in an upside down posture in the fossilised head. The discoverer claims the mammoth find to be the largest (in size) of its kind in the world.[100] Again at Wapzun in south Kashmir the animal was found from a horizon deposited during a cold arid climate of glacial period[101] and may thus represent the woolly mammoth capable

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98 G. L. Badam, 'Additional mammalian fossils in the Karewas of Kashmir, *Current Science*, Vol. 41, No. 4, 1972, pp. 529-30; Ashok Sahni, 'Karewa vertebrates: Biostratigraphy, Palaeohistology and Palaeoecology', *Man and Environment*, Vol. VI, 1982, pp. 16-20; S. B. Kotlia, A. Sahni, D. P. Agrawal and R. K. Pant, 'New vertebrate evidence for the age of the Karewa sediments, Kashmir', *Man and Environment*, Vol. VI, 1982, pp. 13-15.

99 S. B. Kotlia *et al. Ibid*, 1982; A. Sahini, *Ibid*, 1982.

100 A M Dar ,'Discovery of fossil skull of *Proboscidian* and Palaeolithic tools from the Valley of Kashmir, India', *Central Asian Digest* ,Vol XXIII, Srinagar, 2003, pp27-29.

101 Rekha Dodia, H. P. Gupta, Chetna Mandavia, Chhaya Sharma and A. B. Vora, 'Palynological Investigation on the Lower Karewas, Kashmir', *Man and Environment*, Vol. VI, 1982, p. 23.

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to live in cold glacial climate; otherwise the elephants today love to live in a warm-wet climate.

The record of the animal was also found in Pakistan from the Siwalik sediments in the Chambal section of around 3.0 MY BP (*E. planiforms*) and in the Pabbi hill of around 1.9 MY BP, and from the Narmada valley belonging to the Middle Pleistocene (*E. hysudricus*)[102], making them earliest in the region.

Horse: Besides the finds of de Terra and Paterson, Badam, Tewari and Kachroo,[103] Kotlia found several specimens of horse from Rembiara, Romshui and Shaliganga sections of the Lower Karewas belonging to an age between 2.0 to 1.6 MY BP and are identified as *Equas sivalensis*.[104] This species has been recorded from the Pinjore beds of the Siwaliks (2.5 MY BP) and the Pabbi hills (1.8 MY BP) in Pakistan and from various other levels of Pleistocene deposits in India.[105]

Deer: Kotlia found deer records from the Romshui and Shaliganga sections of the Lower Karewas. Most of these fall between 2.4 to 1.6 MY BP and are identified as *Cervus sivalensis* and *Cervus punjabiensis*.[106] In the Siwaliks the earliest record of deer belongs to about 2.7 MY BP[107].

Giraffe: Among the earliest remains of animal, Kotlia found a premolar of a giraffe from the Hirpur section of the Lower Karewa.[108] The location makes it older than 2.3 MY BP. In Pakistan its earliest record is of middle Gilbert Chron (3.9 to 3.4 MY BP).[109]

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102 D. P. Agrawal, *Man and Environment in India*, p. 112

103 S. B. Tewari and R. K. Kachroo, 'On the occurrence of *Equas siwalensis*, from Karewas of Shopian, Kashmir', *Recent Researches in Geology*, Vol. 3, 1977, pp. 468-77.

104 S. B. Kotlia, *Current Science*, Vol. 54; *Man and Environment in India*, pp. 112-13.

105 S. B. Kotlia, *Current Science*, Vol. 54; *Man and Environment in India*, pp. 112-13.

106 S. B. Kotlia, *et al.*, *Man and Environment*, Vol. VI.; *Man and Environment in India*, p. 114.

107 *Man and Environment in India*, p 114. The famous Kashmir stag, Cervus *elephas hanglu*, is now found mostly in the northern parts of the valley.

108 *Man and Environment in India*, p 114-115

109 *Man and Environment in India*, p 111

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Dog: Kotlia found *Canis* record from karewa horizons which are younger than 300,000 BP[110]. It has been identified as *Canis vitastensis*. In Pakistan it is reported from Pinjore formations (2.5 MY BP) and other localities of around 1.9 MY BP[111].

What the record of the above animals suggests is that these lived in Kashmir from around 2 million years onwards and at a time when the basin was still occupied by the lake and may have thus lived in the upper reaches. As a result of chronometric dating of the horizons bearing the faunal record it is also clear that the view held by scholars such as Zeuner[112] that villafranchian animals like *Equas, Cervus, Elephas*, etc. appeared at the beginning of the Pleistocene needs to be corrected as these had actually appeared in the Pliocene epoch in the Himalayan-Siwalik region in the north of the Indian subcontinent including Kashmir.

The sequence of faunal remains is not continuously available to have a complete picture of the animal history from the Pliocene-Pleistocene epochs up to the present time. However, around 5000 BP there is evidence of the existence of many wild animals living in the Valley. These were the stag (*Cervus elephas*), the ibex (*Capri ibex*), the tahr (*Capra jamalica*), wild cattle, (*Bos namadicus*), wild goat (*Capra aegagrus*), wild sheep (*Ovis orientalis*), the wolf (*Canis lupus*), the here (*Lupus*) the bear (*Ursus*) the hedge-hog, rodents and the beaver.[113] In the following 500 years many domesticated animals also appeared such as the sheep (*Ovis aries*), the goat (*Capra hircus*), the cow (*Bos indicus*), the dog (*Canis familairis*), the pig (*Sus scrofa*), and the fowl (*Gallus*).[114] Besides these, humped cattle (*Bos indicus*), domesticated buffalo (*Bubalis bubalis*) and nilgai (*Bos-elephas traqocamelus*) are also reported to have

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110 B.S.Kotlia, *Current Science*, Vol.54; *Man and Environment in India*, p. 111.

111 B.S.Kotlia, *Current Science*, Vol.54; *Man and Environment in India*, p 112.

112 F.E.Zeuner, *Pleistocene Period*, London, 1959.

113 A.K. Sharma, Excavations at Gofkral- 1981'. *Puratattva*, no 11, 1979 -80, ed K.N. Dikshit, 1982.

114 A.K. Sharma, *Puratattva*, no 11.

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lived in Kashmir.[115] The domestication process has continued since then as the present fauna represents many of those domesticated species that were found some 5000 years BP. The case is similar with the wild types,[116] indicating thereby that the ecology of Kashmir has not changed much during the last 5000 years to affect the living conditions or habitat of animals in Kashmir.

To conclude, the entire evidence of morphological formations present in the geological sediments has revealed a composite history of past 4 million years. Application of scientific disciplines has shown how the Kashmir basin was transformed in to a vast lake – a fact which somehow was preserved in the historical myth also. The morphological changes that occurred thereafter were enormous both in respect of alignment of the Valley as well as its landscape. Its earlier descent from north to south was tilted to the present south to north orientation. This major alteration has allowed the drainage to empty on the north-western fringe instead of the south-western.

The new landscape of *wudars or karewas* dots the flanks of the mountains that encircle the Valley. These relic lake deposits of more than 3 million years of mud, gravel, sand, etc were capped by the aeolian deposit of loess that also has covered the Valley floor, its meadows and farm lands. This landscape is covered with grasses, food plants and various kinds of trees to make the Valley enchantingly beautiful. This happened only after the relic lake mud got stabilised and new vegetation appeared.

Like in the past broad leaved plants love warm environmental conditions and are mostly found on the Valley floor while the cool

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115 Mohammad Naseem, *The Neolithic Cultures of north western Indo- Pakistan Sub-Continent*, New Delhi, 1982, p 174; he reports the Burzahom information as collected by him from T. N. Khazanchi.

116 The present fauna of Kashmir is represented by sheep (*Ovis*) goat (*Capra*), buffalo (*Bos bubalis*) ponies (Equas caballus), musk deer (*Moshus moschiferus*), barasingha deer (*Cervus elephas hanglu*), fox (*Vulpes bengalensis*), black deer (*Antelope cervicapra*) leopard (*Prionalurus bengalensis*), bear etc. Besides in its lakes and rivers there are many types of fish, which include brown trout (*Salmo trout fario*), rainbow trout (*S. girdnari girdnari*), *Cypris capria communis, C. carpio scapularis Schizo- thorax esocinus, S.curvifrons,* etc, D.P. Agrawal, *Man and Environment in India*, p. 99.

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loving conifers is the vegetation cover of the snow clad mountains. This was also the natural habitat of Kashmir in the past unless man started deforestation for agricultural operations by the middle of the Holocene to induce new elements to grow. These are still abundantly available in the Valley to help the inhabitants to pursue their activities.

The present cool temperate climate of Kashmir was set by the rise of the Pir Panjal to its present height otherwise the past dry tropical climate, like that of Delhi or Agra of the Indian plains, may have continued. The enchanting and pleasant climate is supplicated by numerous streams and brooks drawing their waters from springs and mountain snows; present and the past accumulations of glaciers, as the glacial sequence, beginning in the Pliocene and continuing in the Pleistocene epochs, have waned but its relics are still extent on the mountain tops. These mountains and higher valleys receive annual accumulations of winter snows on account of the Mediterranean winds that keep the Valley cool for most of the summers.

This has continued for years now and in fact atleast from the middle of the Holocene. The environmental stabilisation saw new ecological setting emerging. Along with the earlier fauna of the Pliocene-Pleistocene, new species and new types settled there. In particular are those that were domesticated and captivated by man to enlarge his mode of production since the middle of the recent epoch.

Given the stupendous changes that occurred and built the ancient lake or the changes that were inflicted to the physiography or else the prevailing severity of climatic conditions, in particular during the Pleistocene, was it possible for the ancient man to live there? The historical myth is reflective of the fact that it was only after the lake was drained that first man could arrive there. Obviously it leads to believe that it happened in the Upper Pleistocene, sometime after 85,000 years before the present. Nevertheless before he is supposed to have come there a large variety of mammals had made Kashmir their home. Inevitably therefore, the best source to tell the history of man is with the help of archaeological research that is discussed in the sequel.

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Summary of Pleistocene events after de Terra and Paterson				Sum
Geological Age	Glacial Age	Geological formation in Potwar	Geological formation in Kashmir	Age
Holocene	Pot-Glacial	T5	T5	12,0
Upper Pleistocene	IV Glacial	T4	T4	18,0
"	III Inter glacial	T3	T3	40,0
"	III Glacial	T2	T2	65,
Middle Pleistocene	II Inter-glacial	T1	T1	70,
				1,
Middle Pleistocene	II Glacial	Boulder conglomerate	Boulder conglomerate in Lower Karewa beds	1
				2.
Lower Pleistocene	I Inter glacial	Pinjore Beds	Beginning of Lower Karewa building	2.
	I Glacial	Tatrot Beds	Terminal moraines and conglomerate	3 1
Upper Pliocene	Pre-glacial	Dhok Pathan beds	Basement Rock	8.6

* Sheela Kusumgar, *et al* 1986, New Delhi

** The magnetostragraphy has dated the events around this time, the Lower Karewa section are dated before 2 MY, one of the date marking Pliocene – Pleistocene boundary. Source: Sh

*** See text

**** Source: H. Rendell and P. D. Townsend, 1988, New Delhi.

\# Source: H. Rendell, 1988, New Delhi; the rest of the Potwar dates are from her earlier work

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Chapter II

THE PALAEOLITHIC CULTURE

Archaeological findings and anthropological researches establish the antiquity, history, and development of prehistoric man through time. This is traced with the help of the reminiscences of the material culture, and the fossils of humans and contemporary primates. The material culture[1], at the beginning of human history, mainly consisted of stone tools[2], which were made and used by man[3] over the years gone by. With the manufacture and use of these stone tools there came into existence an archaeological age termed the Palaeolithic period. The Palaeolithic, earlier called the Old Stone Age, is the longest stage in the cultural evolution of man, dating from about 2.4 MY BP to about 9000 BC when various types of rough surfaced stone tools were made, but never ground to produce an even surface.

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1 Culture in itself is the patterned behaviour (mental and physical) that individuals learn, are taught and practice in the course of their development and maturation within the social groups to which they belong, M. K. Nickels, D. E. Hunter and P. Whitten, *The Study of Physical Anthropology and Archaeology*, London, 1979, p. 264. In a Prehistoric culture we study materials fashioned and used by the past human societies for which literary records or even verbal traditions do not exist.

2 Stone tools, inorganic material and thus imperishable, have survived over the years whereas perishable organic material like wood, bone, etc. if used as tools or for tool making in the beginning of prehistoric culture have not survived.

3 David Pilbeam and Elwyn Simons believe that the Miocene *Ramapithecus* population may have been tool-using (unfabricated) animals, 'Some problems of Hominoid classification', *American Scientists*, Vol. 53, 1965, pp. 98-120; to which L.S.B. Leakey added the evidence that this population broke open marrow bones, 'Bone smashing by Late Miocene Homonidae', *Nature*, Vol. 218, 1968, pp. 528-30. But the earliest record of fabricated stone tools of about 2.4 MY BP was found by Mary Leakey which were associated with first human primate – *Homo habilis* in stratified layers at Olduvai in Africa, Richard Leakey and Roger Lewin, *Origins*, New York, 1977, pp. 85-103; which subsequently evolved with the development of Homo species.

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Table 1: Archaeological/Hominid chronology

Years BP X 1000	Geology	Archaeology	Homo species
9		Neolithic Mesolithic	
12	Holocene		
		Upper Palaeolithic	
40			*Homo sapiens*
80	Upper Pleistocene	Middle Palaeolithic	*Neanderthals*
8,00	Middle Pleistocene		
1,000			
			Homo erectus
2,000	Lower Pleistocene		
		Lower Palaeolithic	
	Upper Pliocene		*Homo habilis*
2,500			

Source: M. K. Nickels, *et al*, *The Study of Physical Anthropology and Archaeology*, London, 1979.

On the basis of shape, size and technique of manufacture the tools are divided into three successive periods: the Lower Palaeolithic, the Middle Palaeolithic and the Upper Palaeolithic (Table I). The Lower Palaeolithic industry, the earliest in the sequence, is characterised by hand axes, cleavers, and chopping tools. The Middle Palaeolithic assemblages contain all the above tool types but are comparatively smaller in size and have even-working edges. The characteristic types are produced from flakes struck from cores, mostly prepared for the purpose. Upper Palaeolithic tool types are lighter with characteristic

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types of blades and burins[4]. During each of these archaeological periods a particular human species is believed to have remained associated with the processing and use of the types of tools (as in the Table I). However, this does not mean that the earlier tools were not in use during the subsequent periods or that the new human species did not use the implements of his predecessors.

The australopithecine fossil remains, to which *Homo habilis* belongs, was concentrated mainly in Africa and a few may have moved to some areas of Asia as well. *Homo erectus,* who followed him, seems to have spread to more areas as his tools are found at many places, in Europe, Africa and Asia in spite of the fact that his fossil record is available at few sites of the three continents. The next man in the evolutionary path, *Neanderthalman* fossil remains are again found at a limited number of sites of Europe and Asia but his tools are widely spread over a large number of sites in Europe, Africa and Asia. The modern man, *Homo sapiens*, crossed all frontiers and even reached the Americas and Australia to begin the history of man there. Accordingly his cultural record is found all over the world[5]. As the fossil record of man himself is found very rarely, it is the discovery of stone tools which mainly facilitates the study of the existence and development of human culture throughout the various geographical regions of the world.

The Palaeolithic Culture of Kashmir:

During their extensive explorations in the 1930's for the study of the geological stratigraphy and associated human cultures of the Pleistocene epoch, Hellmut de Terra and T. T. Paterson found no Palaeolithic implements in Kashmir even though these were abundantly found in the Potwar.[6] The reason for the absence of man

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4 F. Bordes, *The Old Stone Age*, London, 1968.

5 M. K. Nickels, *et al, Anthropology and Archaeology*.

6 Hellmut de Terra and T.T. Paterson, *Studies in the Ice Age in India and Associated Human Cultures*, Washington, 1939. Paterson reported a large collection of these tools from the Potwar from the sediments which were co-related with the geological sediments of the Pleistocene Kashmir, *Ibid*, pp. 301-12; where, however,

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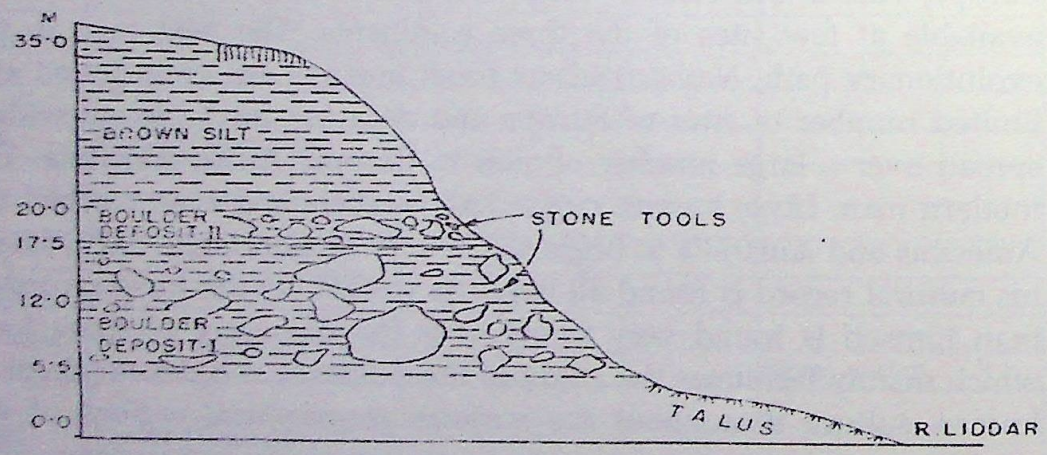
was attributed to the severe and intense cold climate and the violent tectonic disturbances which occurred in the Pleistocene epoch. However, the theory was challenged in 1969 when Prof. H. D. Sankalia discovered two Lower Palaeolithic tools in the Liddar valley of Pahalgam, in north Kashmir (Pl. I).[7] Both of these two tools not only proved the presence of man in Kashmir but it was also remarkable that both the tools are the earliest in Asia, as demonstrated by their stratigraphical location and the technique of their manufacture.[8]

Fig. 5 Section of the right bank of the Lidder, Pahalgam



The earliest of these tools is a massive flake (Fig. 8), measuring 25.7 x 16.5 x 6 cms, made of black Panjal trap. It was embedded at the base of a bed of boulder conglomerate, which is about 5 meters above the river level at Pahalgam[9] (Fig. 5). This conglomerate bed is about 15 meters thick and is composed of quartz, quartzite, Panjal trap, limestone all cemented together by calcareous rock flour. The bed was

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the tectonic upheavals played a definite role in fashioning the geomorphology of the plateau.

7 H. D. Sankalia, 'New Evidence for Early Man in Kashmir' *Current Anthropology*, Vol. 12, Nos. 4 and 5, 1971, pp. 538-61; *Pre history and Proto history of India and Pakistan*, Poona, 2nd ed. 1974.

8 H. D. Sankalia, *Pre and Proto history*.

9 The section, exposed on account of road cutting at Pahalgam near the Golf Club, is on the East Liddar, H. D. Sankalia, *Pre and Proto history*.

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deposited there, according to Paterson, during the II Glacial stage that was believed to be of the Middle Pleistocene.[10] In other words, the flake tool was deposited at Pahalgam during the early phase of the II Glacial stage, whereas the earliest of such flake tools in rest of Asia, at Potwar, typologically resembling the Kashmir example, were deposited there in the corresponding geological formation during the retreat phase of the II Glacial stage.[11]

It has been stated earlier that the four fold glacial history in the Pleistocene as well as the notion regarding its happening in the last one million years is challengeable on the basis of the evidence of finding the first record of the glacial age in the Upper Pliocene. Otherwise one would have said that the Pahalgam flake tool originated around or slightly latter than 1 MY BP. This is not the case and new glacial history places it in between 2.6 to 2 MY BP. Having said this, the tool belongs to the Upper Pliocene and not the Pleistocene. Such tools found at Potwar are now chronometrically dated to 2 MY BP[12] and

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10 Hellmut de Terra and T. T. Paterson, *Studies in the Ice Age.*

11 *Studies in the Ice Age,* pp. 301-12. These tools called pre-Soan at Potwar are regarded, by Paterson, the earliest human tools fabricated in Asia which were not found *in situ* but only on surfaces of such deposits and originated during the later stages of the II Glacial stage. Archaeologists like Stiles, Dennell, however, suspect these flake tools of Potwar to be genuine tools instead are called 'nature facts', R. W. Dennell, 'The importance of the Potwar Plateau, Pakistan, to the studies of early man', *South Asian Archaeology* 1981 (1984), pp. 10-19. Perhaps on this analogy, D. P. Agrawal too raised a question about the genuineness of this Kashmir tool, *The Archaeology of India,* 1982, London.

12 Siwalik series deposits in Pakistan have recently been studied afresh and magnetostratigraphically dated, by a team of archaeologists and earth scientists from Pakistan, USA and Britain. The chronometric dates for the revised Pleistocene sequence attempted at Potwar have been matched by Rendell for the archaeological implements found therein and are reported in Helen Rendell, 'The Pleistocene sequence in the Soan valley, northern Pakistan'. *South Asian Archaeology,* 1981 (1984) pp. 3-9; B. R. Allchin, 'Earliest traces of man in Potwar Plateau, Pakistan, a report of the British Archaeological Mission', *South Asian Studies,* Vol. 2, 1986, pp. 69-83; and Helen Rendell and R.W. Dennell, 'Dated Lower Palaeolithic artifacts from Northern Pakistan', *Current Anthropology,* Vol. 26, No. 3, Chicago, 1985,p. 393.

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correspondingly the Kashmir tool should belong to an age earlier than this.

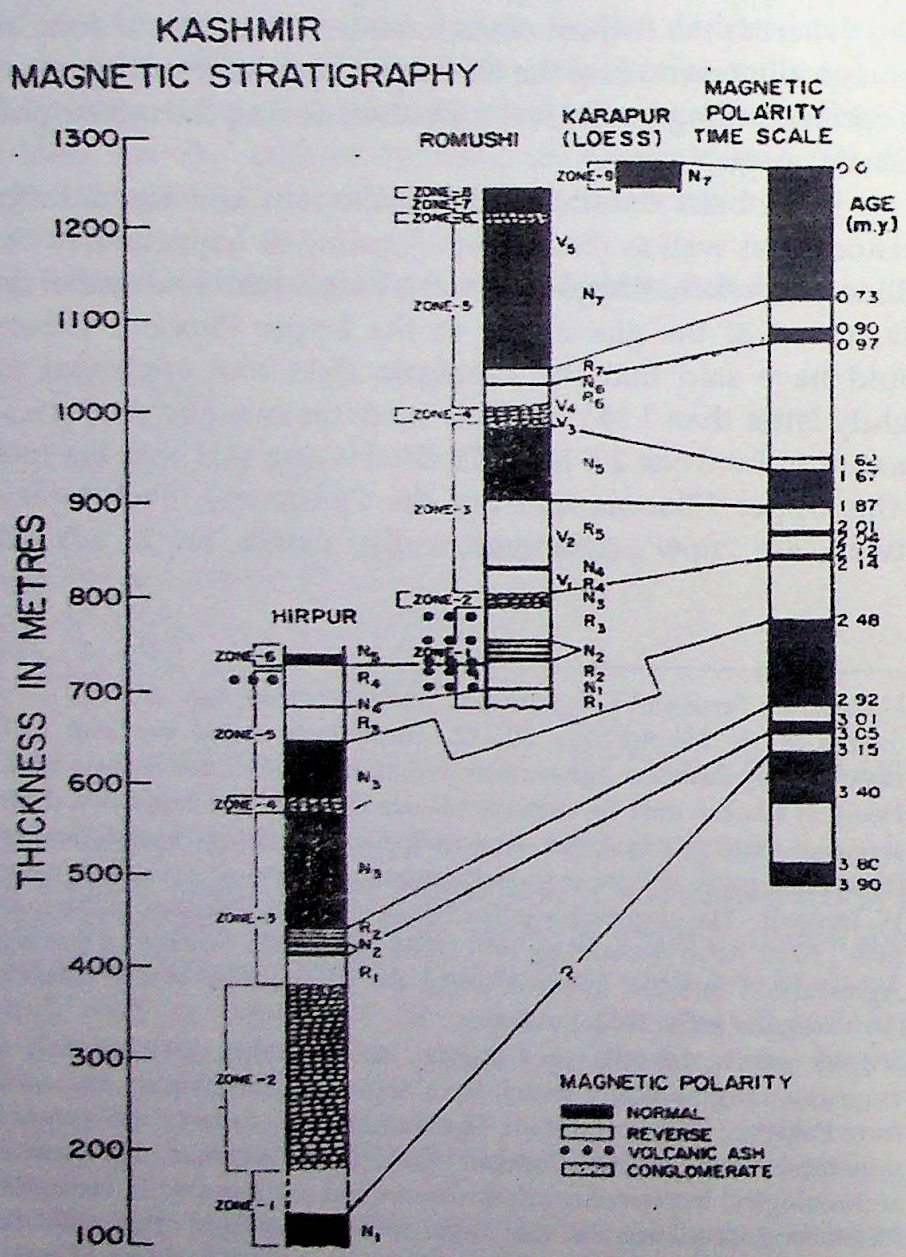

Fig. 6 Correlation of the Hirpur and Romushi section against the global magnetic polarity time scale. *Note the Romushi karewa profile and the two conglomerate beds; zone 2 and 4 falling respectively at 2.14 and 1.67 MYBP.*

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The revised glacial sequence is yet to be accurately matched chronometrically with the result a precise date for the archaeological implement is not available. However, the stratigraphically laid karewa profile has provided certain chronometric dates on the basis of magnetostratigraphy. The profile has many conglomerate deposits at various depths, the first two from the base onwards falling in the Pliocene (Fig. 6), and dating somewhere between 3.15 and 2.50 MY BP[13]. These two dates are out of reach for the implement on the ground Homo habilis was yet to emerge or yet to make the tools. The third conglomerate deposit, from bottom to top in the sequence, is dated sometime around 2.14 MY BP in the Romushi profile (zone 2). It is possibly this deposit that corresponds with the Lidder deposit from where the implement was found.

Considering that the history of tool making started somewhere after 2.40 MY BP (supra Table I) the Pahalgam tool fallows this date. The 2.14 MY BP date, in the Upper Pliocene, for the deposition of this flake tool is earlier than the 2 MY BP Potwar tools, as was stratigraphically found. What Prof. Sankalia argued, in this respect, was that the flake tool, as its specific location at the base of the conglomerate bed would suggest, belonged not to the II Glacial, but to the I Interglacial stage, since this date 'would be in accord with the sedimentological perception which requires some allowances for a time lag between the manufacture of the tools, and their dispersion and deposition through the geomorphic agencies'[14].

In other words we are trying to place the 2.14 MY BP date of the tool manufacturing man in the interglacial climate which was considered to have been 'milder than in the previous period—in fact, it must have been similar to that of the recent times.....the summers warmer and more humid'[15]. How long such a suitable climate survived for him is not exactly known but certainly for thousands of years — the change noticed around 1.8 MY BP. Since conditions were in his favour

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[13] Sheela Kusumgar, D. P. Agrawal and S. B. Kotlia, 'Magnetostratigraphy of the Karewas', *Climate and Geology of Kashmir and Central Asia, the last 4 MY*, 1985, New Delhi, p. 13.

[14] H. D. Sankalia, *Pre and Proto history*.

[15] Hellmut de Terra and T. T. Paterson, *Studies in the Ice Age*, p225.

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'with abundant game available in the form of many mammals and birds inhabiting the lakeshores and valleys'[16] this man in Kashmir would have lived a prosperous life.

The other tool measuring 14.5 x 9.6 x 6.5 cms is a crude hand-axe (Fig. 9), roughly pear-shaped, and is made on a quartzite nodule. It was found at the junction of the boulder conglomerate and brownish clayey soil. The 13 meter deposit of brownish soil which rests on the poorly cemented top portion of the boulder conglomerate at the same site of Pahalgam, wherefrom the flake tool was found, is assigned to the II Interglacial stage.[17] This hand-axe of Pahalgam, too, is regarded by Prof. Sankalia to be the earliest in Asia on the both technological and stratigraphical grounds;[18] as (a) the hand-axe is technologically Abbevillian[19] whereas the earliest hand axes found in other parts of the continent are the advanced types called Acheullian[20], and (b) the geological strata in which the hand-axe at Pahalgam was found is older in age than those deposits bearing hand-axes in other parts of the region.[21] The stratum, bearing the earliest hand-axes in Asia, is chronometrically dated 700,000 BP.[22]

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[16] Hellmut de Terra and T. T. Paterson, *Studies in the Ice Age*, p225.

[17] Hellmut de Terra and T. T. Paterson, *Studies in the Ice Age.*

[18] H. D. Sankalia, *Pre and Proto history.*

[19] Abbevillian is the earlier of the two stages of hand-axe tradition (bifacial core tools) named after the place name Abbeville in France. This industry is characterized by crude, massive hand axes, made by direct percussion method using stone hammer on stone anvil. The industry was also called Chellean, after the type site in Africa but is now called Lower Acheullian, F. Bordes, *The Old Stone Age.*

[20] Acheullian is the second stage of the hand-axe tradition named after the type site at St. Acheul in France. It is characterized by hand-axes which are refined, indicating an evolved stage from that of Lower Acheullian and are made by direct percussion method using soft hammer on hand to give controlled flaking, F. Bordes, *The Old Stone Age.*

[21] H. D. Sankalia, *Pre and Proto history.* The earliest Palaeolithic tools found in the region are found in the Potwar. These tools as claimed by Paterson (*Studies in the Ice Age*, pp. 301-21) show two traditions (i) Soan tradition made on pebbles (mostly choppers also called pebble tools) including a small collection of flake tools called pre Soan. The pre-Soan tools originated during the retreat phase of II Glacial and lasted till the beginning of the II Interglacial stage, *Studies in the Ice Age*, pp. 222, 265, and 302. The pebble tools are divided into three groups. Of these towards the

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There is no definite date available for the conglomerate bed on which the handaxe in Pahalgam was found but the corresponding conglomerate bed in the Romushi karewa (Fig. 6) is dated to 1.67MY BP (zone 4) and as such it is very probable that this hand-axe from Kashmir, too has an age somewhere after 1.6 MY BP and before 700,000 years BP[23]. As the Pahalgam 15 meter thick conglomerate bed, from where this tool was found, is divided into two parts by an unconformity, the top portion of it may represent this conglomerate bed of the karewas. Even though this bed is separated from the previous bed of about 2.14 MY BP by mud and silts in the karewas it is, however, clear that Kashmir had a cold climate at least from 1.8 MY BP which may have persisted with slight variation and hence unconformity till about the arrival of brown silts at Pahalgam around 1.6 MY BP.

Following the discovery of these important archaeological tools, a renewed interest in the Palaeolithic archaeology of Kashmir developed. Thereupon, more stone-tools belonging to the Lower and

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middle of the II Inter-glacial stage, Early Soan pebble tools emerged, Late Soan tools appeared during III Glacial and finally Evolved Soan tools during the IV Glacial stage. Whereas the last type represents the Middle Palaeolithic culture, the rest of these belong to the Lower Palaeolithic culture. (ii) The second tradition is that of Acheullian hand-axes which appeared in the II Interglacial stage and continued till the Late Soan pebble tools. It was believed by Paterson (*Ibid*) that the two traditions had independent origin and co-existed without any amalgamation. Paterson further explained that the hand-axe element in the Potwar got introduced due to the arrival of the African tradition, T. T. Paterson, and H. Drummond, *Soan the Palaeolithic of Pakistan*, Karachi, 1962, p. 95. This was as the pebble tools and hand-axes were not reported from one single place which is what is being now contested after finding the tools belonging to the two traditions at one single location, M. Salim, 'Hand axe collection of Northern, Pakistan'. *Journal of Central Asia*, Vol. IV, No. 1, Islamabad, July 1981, pp. 142-175. Like wise the Kashmir tools from Pahalgam, representing what appeared to Paterson the two tradition in Potwar, have not only been found at one archaeological site but even from the same geomorphological section.

22 Supra note 13.

23 The chronometric date here is that of the fourth conglomerate bed in the Lower Karewas from the base onwards, see Fig 6 above; Sheela Kusumgar, *et al*, *Climate and Geology in Kashmir*.

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the Middle Palaeolithic periods were located from the high altitude river valleys of the Sindh, (Fig. 10 & 12)[24], the Liddar (Fig. 11, 13 - 23)[25] and the Rembiara[26]. These tools were collected mostly from the geological deposits which were assigned to the so called II Glacial, II Interglacial and III Glacial stages of the Middle and the Upper Pleistocene epoch[27].

However given the new frame work that II Glacial was in existence around 1.8 MY BP one may assume that these were manufactured intermittently after about then, soon after the Lower Pleistocene set in and continued till the Middle stage of the geological period when cold climate was interrupted by the warmer one at least once when the so called II Interglacial deposits were laid out. These comprise handaxes, choppers, discoids, scrapers and borers which could have been utilized for a variety of purposes like cutting, chopping, skinning, scraping, etc of bulbs, fruits and large sized wild animals, such as the antlered deer, the horse, the elephant, the

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[24] Prof. H. D. Sankalia was joined by R. V. Joshi, Z. A. Ansari and S. N. Rajguru in 1970 for the exploration of the geological sediments in the Sindh and the Liddar valleys as well as in Gulmarg in search of archaeological tools, after the discovery of earlier two tools. They found ten more tools from the river valleys, H. D. Sankalia, *Pre and Proto history.*

[25] R. V. Joshi, S. N. Rajguru, R. S. Pappu and B. P. Bopardiker found ten more early Palaeolithic tools in 1972 from Pahalgam area, 'Quaternary Glaciations and Palaeolithic Sites in the Liddar valley, J&K', *World Archaeology*, 1974, pp. 369-79. One such pebble tool was also collected by B. K. Sinha from a terrace formed in the Liddar valley near Pahalgam, *IAR*, 1984-85, p. 167.

[26] During their study for the Palaeoclimatic Project on Kashmir, D. P. Agrawal and others of the team found Palaeolithic site of chopper chopping complex comprising choppers, massive discoids, scrapers on the top of a terrace of the river Rembiara at Balapur near Shopian. However, these were not found from a stratified context, D. P. Agrawal, 'The Kashmir Karewas – a multi-disciplinary perspective' *Man and Environment*, Vol. VI, 1982, pp. 1-4. R. C. Agrawal also reports collection of a tool from Gulmarg, *Kashmir and its Monumental Glory* ,1992, New Delhi, p 48

[27] Middle Pleistocene age started after around 1 MY BP whereas Upper Pleistocene began around 100,000 BP. (Supra Table I).

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rhinoceros, the bos, the felis, the pig and the giraffe present in Kashmir.[28]

The fluctuating climatic conditions not with standing, these stone tools, belonging to the Lower and the Middle Palaeolithic periods, collected from high altitude river valleys suggest that (a) the presence of early man in Kashmir is not only proved, but that too continuously throughout the different archaeological periods, even though no hominid fossil remains have so far been found, (b) that Kashmir during these archaeological periods was inhabitable at higher reaches even if the major part of the basin floor was occupied by the vast lake, and (c) that the shifting geomorphological, environmental and ecological conditions did not hamper the life of man there but, instead, may have contributed to the development and evolution of tool types with varied technology. Such a stage of development in tool technology is reflected by the stone-tools found from the hills surrounding the Mansbal Lake (Fig. 7).

Many palaeolithic tools in close vicinity to several caves were found at Mansbal.[29] Mansbal is located at the foot of the Sindh valley, some 35 kms north of Srinagar, and has a deep but small lake surrounded by karewas and mountains. One such chain of mountains on the east of the lake has many folds and ridges where several habitable caves were found. These caves remain on an average about 600 meters above the existing lake level. The palaeolithic tools were located on the gentle mountain slopes in the sections which have been

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[28] The fossilized remains of these wild animals were reported from the deposits of Pleistocene epoch by Hellmut de Terra and T. T. Paterson, *Studies in the Ice Age,*; D. N. Wadia, 'Pleistocene Ice Age deposits of Kashmir', *Proceedings of National Institute of Science India*, Vol. 7, No. 1, 1941, pp. 19-59; B. S. Kotlia, A. K. Sahni, D. P. Agrawal and R. K. Pant, 'New Vertebrate evidence for the age of the Karewa sediments, Kashmir' *Man and Environment*, Vol. VI, 1982, pp. 13-15; A. K. Sahni, 'Karewa vertebrates: Biostratigraphy, Palaeohistology and Palaeoecology', *Man and Environment*, Vol. VI, 1982, pp. 16-20.

[29] The investigations were carried in November 1996 by the author, Aijaz A. Bandey, 'Palaeolithic Habitational site at Mansbal, Kashmir: Recent Archaeological Investigations', *Journal of Central Asian Studies*, Vol. 8, No. 1, 1997, pp. 95-104; and, 'Antiquity of Man in Central Asia: A summary', *Central Asia – Continuity and Change*, ed. M. A. Kaw, Srinagar, 1999, pp. 183-98.

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cut by rain forming gullies below the caves. The tools (Fig. 24 – 29, Pl. I) mostly bifacial are cleavers, hand axes, pointed tools and scrapers.

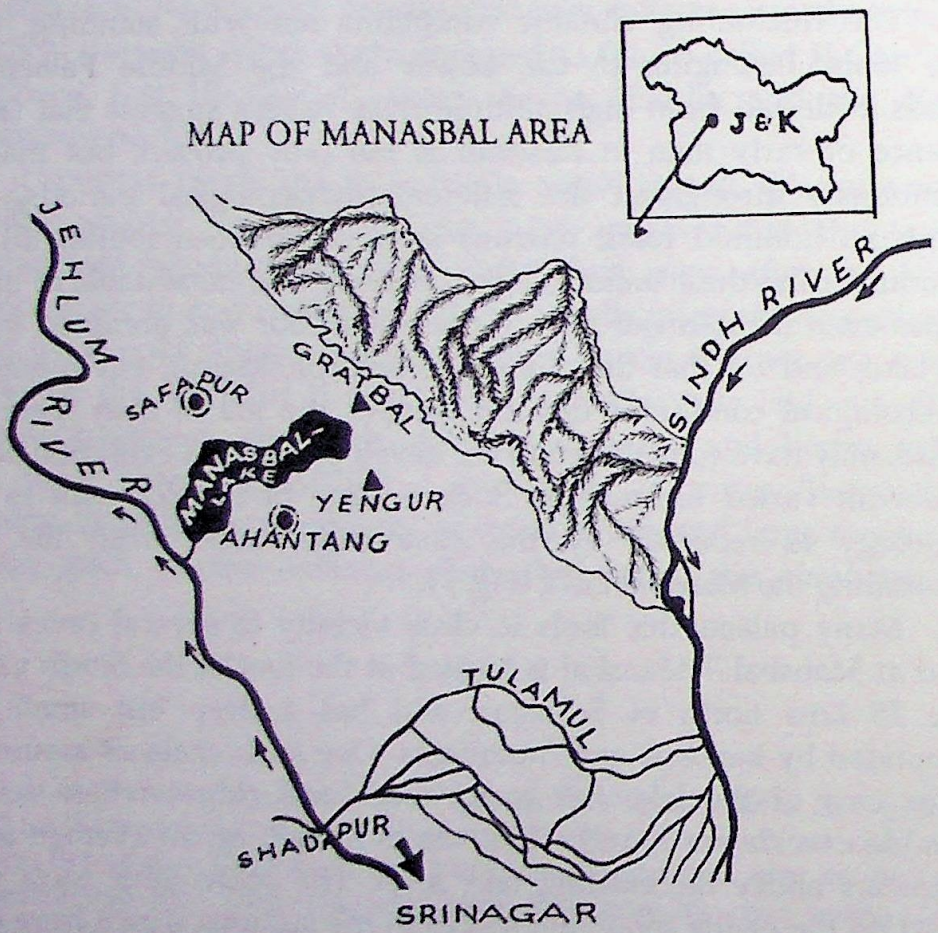

Fig.7 Mansbal area with the surrounding hills

These tools show Middle Acheullian technique in their fabrication. These may as such belong to the Lower and the Middle Palaeolithic period of the Middle Pleistocene epoch. However, there are no Mousterian cores found along with them. These tools have been found around the shores of the erstwhile Kashmir Lake, they may, therefore, suggest that man subsequently moved down to comparatively low altitudes where he located for himself dwellings in the form of caves. These caves would not only have enabled him to withstand the ravages of climate but also provided him protection against possible attacks from wild animals. The cave dwellings would

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have further allowed man to acquire knowledge of the environment, and to develop human relationships and social groups for survival.

A similar proof of such cultures existing in Kashmir has been located recently in the north Kashmir near the Wular Lake at Bomai, in Sopore where near a huge rock shelter was found an evolved Acheullian hand axe[30]. This type of the tool was present during the Middle Palaeolithic as well as in the Upper Palaeolithic periods. This is the place where they may have lived for longer periods as near by was located a prehistoric rock engraving, the first and only kind of this nature found so far in Kashmir. The engraving of the Upper Palaeolithic period depicts chase and game engagements of the prehistoric population[31]. The presence of the tool near the shelter is an indication that prehistoric people found suitable places to live even when they found the Valley floor not available or conducive for the purpose. What the present discoveries have shown is that Mansbal and Bomai are not only important Palaeolithic areas but also have provided a continuous history of the Palaeolithic tools. It also has shown that evolving human species utilized available means and progressively improved tool fabrication technology.

A further proof of the development in tool technology is demonstrated by the stone tools found from the loess deposits on the top of the Karewas at Somber, near Srinagar.[32] In size, substance and technique of manufacture these tools are different from those referred to above. The Somber tools are of comparatively smaller size and are made from jasper, siliceous lime-stone and trap. The tools are fabricated on a prepared core technique[33] and comprise burins, borers and points (Pl. II). On the basis of their size and the technology

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[30] Aijaz A Bandey, "Preliminary Report: Archaeological explorations in Bomai village, Sopore," *Central Asian Digest*, Vol XXIII, 2003, pp10-12.

[31] See infra chapter IV for details.

[32] R. K. Pant, C. Gaillard, V. Nautiyal, G. S. Gaur and S. L. Shali, 'Some New lithic and ceramic Industries from Kashmir', *Man and Environment*, Vol. VI, 1982, pp. 37-40.

[33] The technique involves careful shaping of a core by the removal of centrally directed flakes and the preparation of an extremity for the detachment of useable tools, F. Bordes, *The Old Stone Age*.

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involved in their fabrication it becomes evident that they belong to the Upper Palaeolithic period which followed the earlier two periods. Besides these tools, Paterson and others too collected 'thin flakes' fabricated on Levallois technique[34] from Somber and alluvial terraces on the bank of Jehlum[35] which likewise belonged to the Upper Palaeolithic period.

As all these tools were found deposited in the loess deposited on the karewas the Upper Palaeolithic culture as such thrived during the Upper Pleistocene epoch. There are reasons to believe that the culture was in existence at a time when the climate was warm and wet some time around 20,000 B.P.[36] The traces of this culture, however, are available in Kashmir till the middle of Holocene, about 5,000 BP[37], as

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[34] Levallois, after a type site in France, is the technique of removing small flake tools from the prepared core. These flakes are usually symmetrical and oval shaped, often without retouch and thus readily usable. On the striking platform of the Levallois tools, small vertical flake scars, called facets, are observed. The use of this technique resulted in the production of not only symmetrical flakes but a subsequent large number of middle flakes from the same core, F. Bordes, *Ibid.*

[35] Hellmut de Terra and T. T. Paterson, *Studies in the Ice Age*, p. 233 and Chr. and J. Hawker (c.f. Hellmut de Terra and T. T. Paterson, *Ibid*, p.233). The exact nature of the tools or their period is not described but are said to have belonged either to the Upper (late) Palaeolithic or proto-Neolithic culture.

[36] The Upper Pleistocene started around 100,000 BP, supra Table I. The Upper Palaeolithic culture at Somber may have started after the stabilization of karewas, once the lake got drained. As the tools are found embedded in the loess deposited on the karewas the culture may as such have started some time after 40,000 BP when the Upper Palaeolithic culture started elsewhere, supra Table I. At Somber it was present around 20,000 BP as estimated on the basis of second palaeosol associated with it, D. P. Agrawal, 'Palaeoclimatic data from Kashmir, *Palaeoclimatic and Palaeoenvironmental Changes in Asia*, New Delhi, 1988, pp. 8-9.

[37] R. K. Pant, *et al.*, *Man and Environment*, Vol. VI, p. 38. The tools were found from loessic horizons of such sites which have also deposits of aceramic and ceramic Neolithic culture in Baramulla and Budgam districts. There is no evidence which could lead to establish that these tools were exactly fabricated around 5000 BP as no such tools were found during the excavations of the Neolithic sites. These tools may have lost their utility some time before the Neolithic period of 5000 BP. However, in the Indian sub-continent, Upper Palaeolithic blade tools were in use as late as the Indus culture of 2500 BC, Bridget Allchin and Raymond Allchin, *The Rise of Civilization in India and Pakistan*, New Delhi, 1983, pp. 131-229.

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the tool types, like parallel sided double scrapers, backed knives, flake knives, etc (Pl. III) are traceable on the loessic deposits of the Upper Karewas.

The discovery of this evolved culture on the loessic deposits, therefore, shows that man shifted to the comparatively low levels and terraces once the geo-physical conditions favoured such movement and the Valley floor became usable after the drainage of the lake and after the karewas had become stable. With the freshly exposed basin floor, new ecological phenomenon appeared on the evolved landscape around the karewas as roaming animals found new pastures in and around the lakes and marshes nearby.

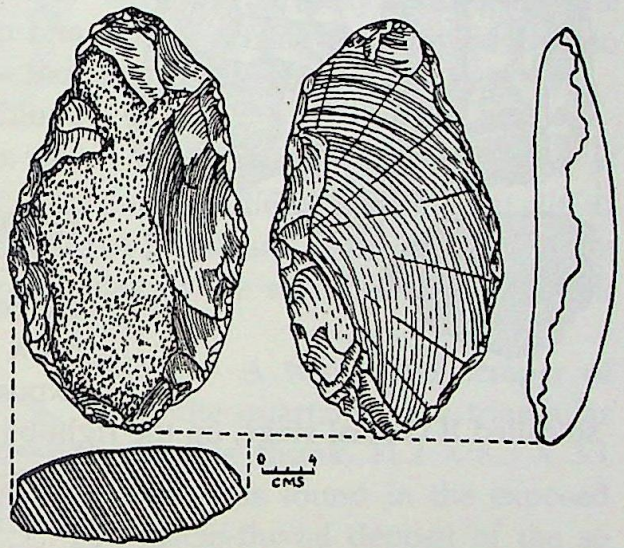

Fig. 8 Flake tool, Pahalgam

Palaeolithic Tools:

Before concluding, a brief description of the Lower and Middle Palaeolithic tools that have been located in the Valley is presented here. Of these the following tools were collected from the Liddar and Sindh valleys during explorations by Sankalia on two occasions, first in 1969[38] and then in 1970[39].

A massive flake, 25.7 X 16.5 X 6.0 cm, (Fig. 8) removed from a boulder of blackish Panjal trap displays bold stepped flaking on one side only, leaving roundish and flattish scars all along the edge. The flake was found embedded in the boulder conglomerate, five meters

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38 H. D. Sankalia, *Current Anthropology*, Vol. 12, Nos. 4 and 5, 1971, pp. 538-61; *Pre history and Proto history of India and Pakistan*.

39 Prof. H. D. Sankalia joined by R. V. Joshi, Z. A. Ansari and S. N. Rajguru in 1970 found ten more tools from these river valleys, H. D. Sankalia, *Pre and Protohistory*.

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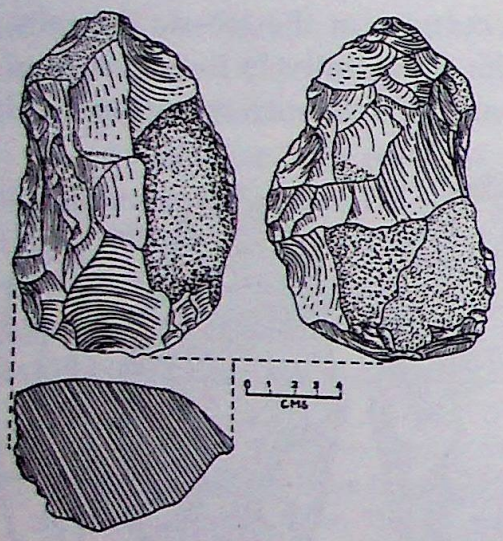
above the right bank of the east Liddar at Pahalgam, dateable to 2.14 MY BP.

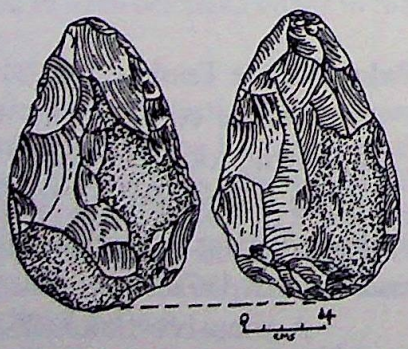


A Lower Acheullian handaxe, 14.5 X 9.6 X 6.5 cm, roughly pear-shaped, was made on a quartzite nodule, and chipped over the entire surface with bold and crude step flaking (Fig.9). The tool was found at the junction of the boulder conglomerate and brown clay at Pahalgam.

Fig. 9 Abbevillian axe, Pahalgam

A chopper, on a plano-convex pebble of whitish quartzite, 8.4 X 7.3 X 3.0 cm, was found in the exposed glacio-fluvial deposit of the so called II Glacial stage, on the right bank of the Sindh river at Prang.

Fig. 10 Scraper, Sonmarg



A scraper-chopper, on an ovoid flat based pebble half, 13.6 X 9.1 X 5.7 cm, of olive-green quartzite was found in the moraine deposit of the so called II Glacial stage at Sonmarg on the left bank of the Sindh (Fig.10). It is heavily rolled, so the bulb of percussion on the under surface and the end of a large flake scar on the left longitudinal side have been practically effected.

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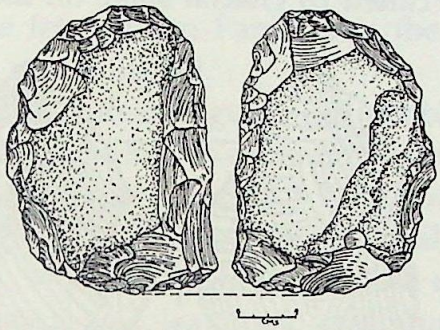
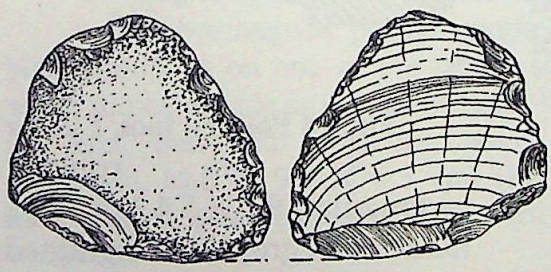
Fig. 11 Convex Scraper, Pahalgam



A convex edged scraper, 16.0 X 12.2 X 4.8 cm, (Fig.11) of olive-green quartzite was found from the east Liddar at Pahalgam in a silty brown clay pocket in the boulder conglomerate of the so called II Interglacial stage.

A straight -edged scraper of olive-green quartzite, 9.5 X 7.2 X 4.7 cm, was found from the left cliff at the east Liddar, on the Circuit Road at Pahalgam, at the junction of the boulder conglomerate and brown clay of the so called II Interglacial stage.



A two-edged scraper of white quartzite on a triangular pebble chunk, 11.2 X 8.3 X 3.1 cm, was found in the exposed glacio-fluvial deposit of the so called II Glacial stage at the right bank of the Sindh at Prang(Fig.12).

Fig. 12 Scraper, Prang

A handaxe cum side scraper, on a small pebble of dark grey quartzite, 8.5 X 6.0 X 4.0 cm, which has crude bifacial flaking and an uneven longitudinal edge, was found in the loose gravel of the so called III Glacial stage on the right bank of the Sindh river at Nunar.

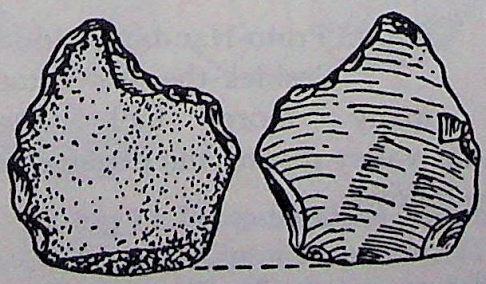


Fig. 13 Borer, Ganeshbal

A borer on a flattish nodule of whitish quartz schist, 6.0 X 5.5 X 2.1 cm, (Fig.13) with a thick

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protruding point made by the removal of large, deep flakes from either side of the point, was found in the Liddar valley from the surface of the slope of a cliff, formed during the so called III Glacial stage on the left bank of the Liddar, opposite the bus stop at Ganeshbal.

From the same locality as the above was found another borer, but not as fine. It is made on a large thick, flattish nodule of olive-green quartz schist, 9.4 X 7.7 X 4.1 cm.

A large borer on a flat slab of grey schist, 16.6 X 10.5 X 3.3 cm was found on the mound overlooking the right bank of the west Liddar at Mamal near the Mammaleshvara temple. It has a beak-like curved point produced by flaking at one of the narrow ends of the slab.

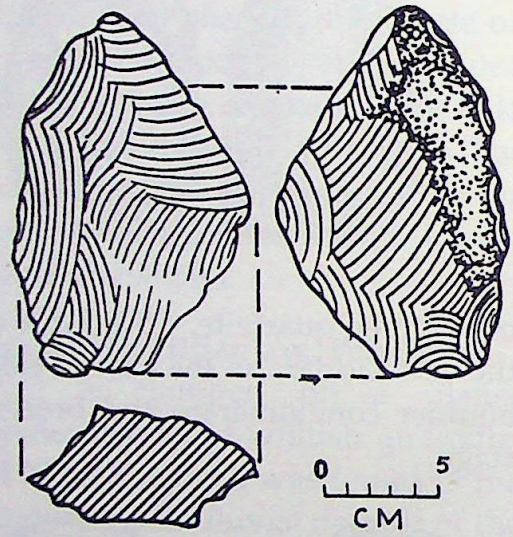

Fig. 14 Pointed tool, Liddar

A core roughly rectangular, 9.7 X 5.4 X 5.1 cm, made from greyish fine grained quartzite, was found near Ganeshbal on the left bank of the Liddar in a cliff formed during the so called III Glacial stage.

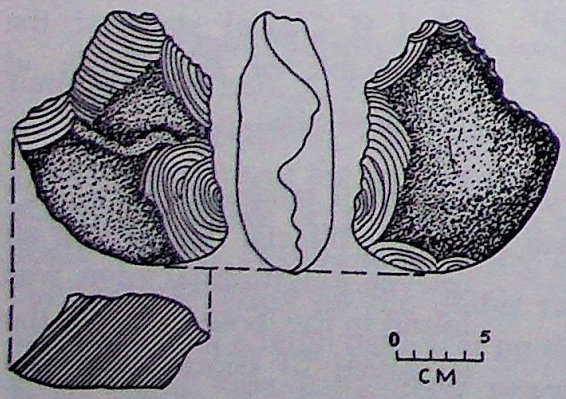

Fig. 15 Proto-Handaxe, Liddar

Besides the above tools many more tools were subsequently collected from the Liddar valley during the explorations in 1972 by R. V. Joshi, *et al*[40] and are as follows:

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[40] R. V. Joshi, S. N. Rajguru, R. S. Pappu and B. P. Bopardiker found ten more early Palaeolithic tools in 1972 from Pahalgam area, 'Quaternary Glaciations and Palaeolithic Sites in the Liddar Valley, J&K', *World Archaeology*, 1974, pp. 369-79.

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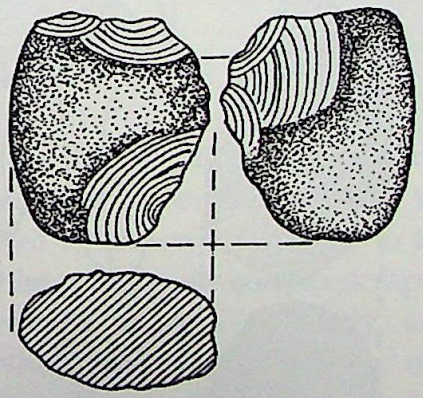
A sub-triangular lump of rock flaked bifacially to form a roughly pointed tool which narrows down at the base, giving a pseudo-shouldered character to it (Fig.14). It is step-flaked on the left margin. Made from green Panjal trap the tool, 12.2 X 8.0 X 4.5 cm, is almost fresh and unrolled.

A sub-triangular flat pebble has bold alternate flaking on the right side, while the left side carries a large rectangular shallow flake scar. The specimen, 15.3 X 14.5 X 6.8 cm, looks like a proto-handaxe (Fig.15). It is made on green Panjal trap and is unrolled and fresh.

An ovoid pebble is flaked rather obliquely at one of the ends of the major axis, leaving a small number of bold flake scars on each face of the pebble (Fig.16). At the other end of the same axis there is a deep scar. It is 11.2 X 8.6 X 5.4 cm, and is possibly a bifacial chopper on pebble. The tool is made from green Panjal trap and is slightly weathered but not rolled.

Fig. 16 Pebble chopper, Liddar

A sub-triangular pebble, worked in both directions on one of the lateral sides, while the other side is left un-worked. With its thick butt and projecting point, the specimen, 14.6 X 9.6 X 6.3 cm, (Fig.17) looks like a proto-handaxe. It is worn and weathered.



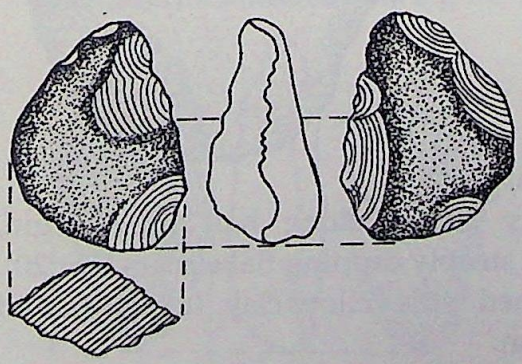


Fig 17. Proto-handaxe, Liddar

A split ellipsoidal pebble, 11.0 X 7.8 X 6.8 cm, is having limited working edge (Fig.18). It has no definite tool form but its main sharp edge could have been used as a chopper.

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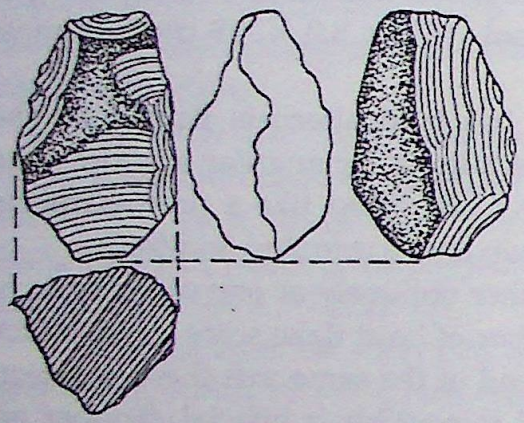
Fig. 18 Chopper like tool, Liddar



A sub-triangular pebble has flake-scars all along the margin except in two small areas where the original pebble surface has not been flaked off. The other face has fewer flake scars and retains more of the original pebble surface (Fig.19). With one projecting stout pointed this specimen could have served as a digging or chopping tool. The tool 14.4 X 10.5 X 6.5 cm, is stained in places with yellow clay and is little weathered and unrolled.

Fig. 19 Chopping Tool, Liddar

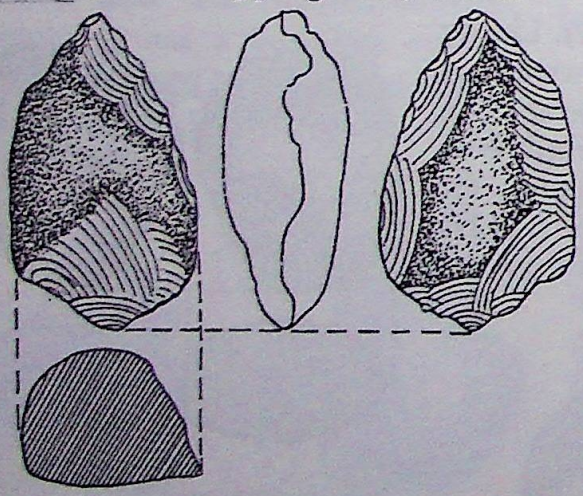
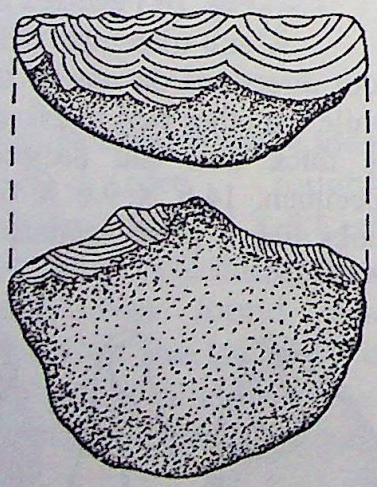


Fig. 20 Pebble scraper, Liddar



A sub-oval pebble with flat base and domed upper surface steeply flaked along half the margin, producing three or four shallow but steeply dipping flake scars (Fig.20). This unifacial pebble scraper is stained with yellow clay. It is worn and a little weathered, 16.0 X 13.0 X6.5 cm.

A pebble roughly of crescent form having sub-triangular wedge-like cross-section is worked on the convex side in both directions by the removal of large shallow flakes (Fig. 21). The opposite margin, being thick, provides a good hand-rest. It could have been used as a chopper.

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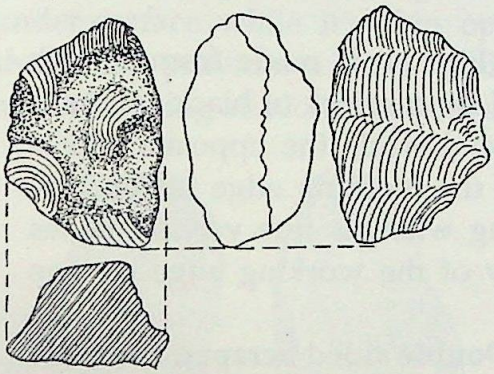
Stained with yellow clay the fresh and unrolled tool is 14.6 X 9.0 X 6.8 cm.

Fig. 21 Chopper, Liddar



A sub-rectangular flake from a pebble, is worked along the margin on the bulbar face having somewhat stepped flake scars (Fig. 22). The other, mainly cortex-covered side carries only a few scars. This specimen could have served as a scraper. Stained with yellowish clay and unrolled, the tool made on the green Panjal trap is 13.4 X 12.5 X 4.6 cm.

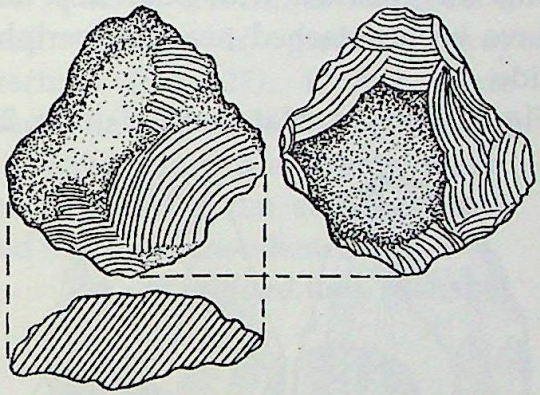


Fig. 22 Scraper, Liddar

An ovoid side-struck flake of rock, sharply pointed at one of the major axis (Fig. 23). In form this specimen is somewhat similar to the one described above bearing fig 19. It is like a wedge or convex-scraper. The convex margin is finely and somewhat steeply worked in one direction. The opposite edge, being thick, could have served as a suitable hand-rest. Roughly it recalls a Mousterian-type scraper with flat un worked base and convex working edge. Stained with yellow clay the fresh and unrolled tool is 13.5 X 7.5 X 4.2

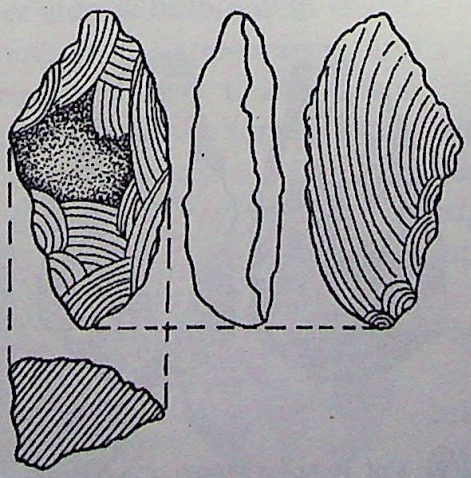


Fig. 23 Convex Scraper, Liddar

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In addition, many more Palaeolithic tools were found at Mansbal,[41] near the caves, which could have served the Palaeolithic men to use as their living abodes. Some of the tools collected there are detailed as:

A cleaver, 13.6 X 9.7 X 3.8 cm, (Fig. 24) is made from a thick semi-ovoid flake that has been removed from a rock of black coloured Himalayan trap. It has a straight butt end while the opposite end is partly damaged leaving only a part of the working edge intact. It is bifacially worked with bold step flaking whereas fine vertical flakes have been detached near the periphery of the working edge on one side.

Fig. 24 Cleaver, Mansbal

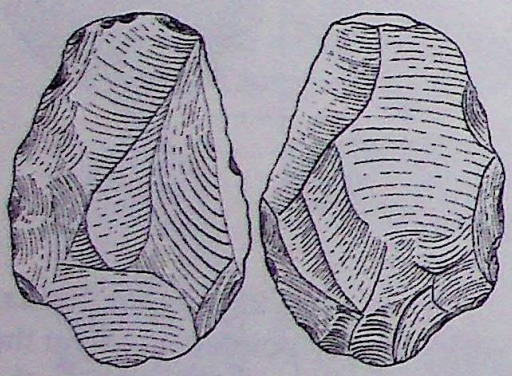
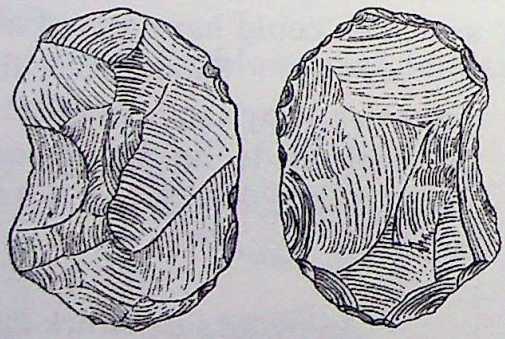


Fig. 25 Double sided Scraper, Mansbal



A double sided scraper, 8.0 X 5.6 X 3.4 cm, made from buff coloured fine grained basaltic rock. Sub-triangular in shape, the flake has shallow flaking on one side while the other side carries deep flake scars (Fig, 25). Secondary retouching is found on its lateral sides as well as on the top. The butt is flattish and straight.

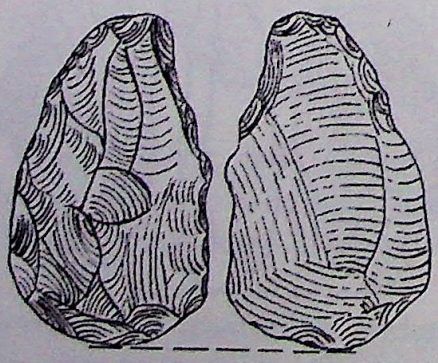


Fig. 26 Convex sided Scraper, Mansbal

[41] Aijaz A. Bandey, *Journal of Central Asian Studies*, Vol. 8, No. 1, 1997; *Central Asia – Continuity and Change.*

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A convex-sided side scraper, 10.6 X 7.6 X 3.5 cm, is made from black Himalayan trap having a white quartzite vein (Fig. 26). The flake detached from a core has large shallow flaking on the convex side on its under-surface while it's thin opposite margin is almost concave in shape and provides a good hand hold. The upper surface of the core has retouching all along the convex working edge.

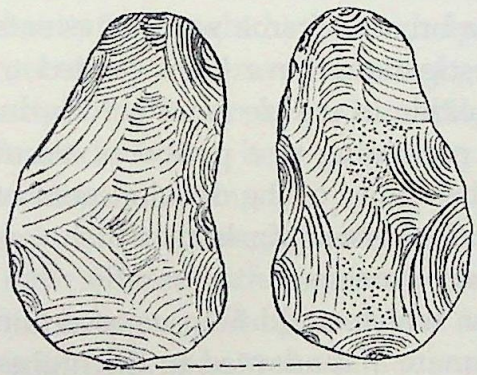
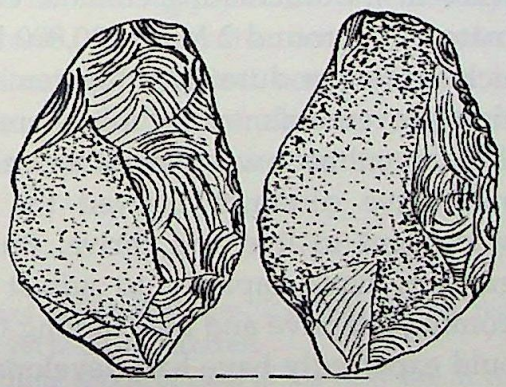


Fig. 27 Hand axe, Mansbal

A hand-axe cum side scraper, 10.0 X 5.5 X 3.4 cm, is made on a small pebble of greenish grey quartzite (Fig. 27). It has crude bifacial flaking while its longitudinal or lateral edges are evenly made. The butt end is flat and the hand-hold has been smoothened.

Fig. 28 Pointed tool, Mansbal



A semi ovoid pointed tool, 8.0 X 4.8 X 2.4 cm, is made from an olive-green fine-grained pebble (Fig. 28). It has lateral shallow flaking on one side leading from the cortex, which is partly left intact. The other side is bulbular in shape, smoother in appearance and carries one deep flake scar on one lateral side to form a sharp cutting edge. The other lateral side has been retouched to gain another cutting edge. The butt end is pointed while the top end is a flattish ovoid.

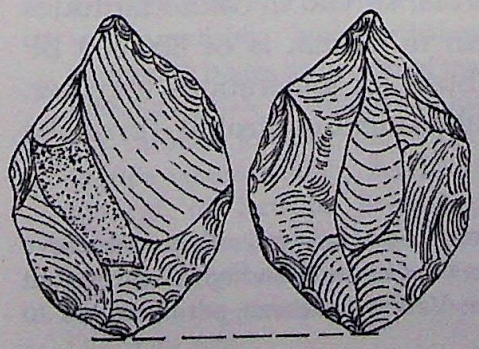


Fig. 29 Borer, Mansbal

A borer, 8.8 X 6.3 X 3.5 cm, is made on a flattish nodule of greenish quartzite (Fig 29). It has a thick protruding point made by the removal

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of large deep flakes from either side of the point. The hand hold is also flaked by the removal of large flakes and in the centre of the body the tool retains a part of the cortex.

Even though not many primary sites have been found, save Mansbal and Bomai[42], yet the record of the Palaeolithic tools from various areas indicates that Prehistoric populations made Kashmir their abode for their living. One may argue that this record is not enormous to build a history of their cultures on a broader frame work of events yet it is also true that not many investigations have been carried to locate the tools and the sites of Palaeolithic in nature from across the Valley. A study of the above tools all pertaining to a period of about two million years is but indicative of the reality of the development of incipient civilization and tool-culture in Prehistoric Kashmir which was the consequence of a gradual evolutionary process.

However, there is no information which could help us ascertain how early man withstood the harsh climate and adapted to the higher reaches in the fluctuating climatic conditions. Given the fact that the climate from around 2 MY to 10,000 BP has shown a lot of fluctuations which for longer duration's has remained severely cold and ice sheets at times covered almost up to the present day Valley floor, the survival of human cultures was not rather easy. In between, the warm periods would have certainly allowed the men comparatively comfortable environment to live and thrive. But it is also a fact that biological organisms have capacity to adjust in fluctuating environments by becoming adaptive and man among them is more adaptive and as such would expectedly have had developed behaviour-pattern to sustain in a wide variety of circumstances.

The invention of fire and its proverbial spread in colder latitudes (earliest record available at Chou'kontein in China, is of 800,000 BP where it seems to had been allowed to burn for generations together, without mastering control of it but its subsequent control at Torraloba

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[42] At Kalaroose, in Kupwara, north Kashmir are found many caves that could have been used by the prehistoric populations given their location on higher reaches but the present disturbed state of affairs in the Valley have not permitted us to investigate the area for such studies.

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in Spain and many other European sites by about 400,000 BP), must have allowed humans to live in a far greater range of environments[43]. Given the geo-physical conditions and climatic behaviour it is difficult to speculate about human abodes in the higher river valleys[44] and their social adaptation for the purpose of survival.[45] During the advanced stages, as at Mansbal, early man shifted to cave dwellings where he could better withstand the hazards of climate, and this form of habitation might have also helped him to develop the social interaction necessary for primitive social grouping. Such type of habitational sites might have also helped to bring about a change in the overall human behaviour and help to evolve an understanding of environment and ecological setting.

The changing environmental and ecological setting itself would have offered different food sources to early man at different stages of his existence. The presence of large carnivores in the Early Pleistocene is an indication that such animals would have fallen prey for the chase and trap to be subsequently killed for the supply of food necessary for survival. The manufactured stone tools were not adequate in themselves to give man any advantage in direct confrontation with large carnivores. They helped in the killing of already trapped or surrounded animals where they were utilised as choppers or chopping or scraping implements.

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43 M. K. Nickels, *et al. Anthropology and Archaeology*, pp. 233-392. In this regard archaeological studies in Kashmir are yet to be undertaken.

44 There are no indications what formed the abode of man in his early life. It could have been large shady trees to keep him away from animals. But subsequently he lived in caves and rock shelters during Middle Pleistocene period wherever these were available. Neanderthalman even built warm dwellings using heavy mammoth bones as structural material and mammoth skin as roof cover to combat the cold climate at Moldova in Russia, F. Bordes, *The Old Stone Age.*

45 For chasing, trapping and killing purpose alone man had to work in bands or groups of individuals. But life in dwellings like caves was significant as large number of humans lived together not only for protection from natural environments but also helping in the possible intensification of social relationship as was found at Chou'kontein in China where sometimes dead were even buried although the same man elsewhere has shown signs of cannibalism, F. Bordes, *The Old Stone Age.*

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The fabrication of new types of implement during the succeeding stages of tool development again did not give any advantage in the killing of animals but the shifting of man to cave dwellings possibly helped in acquiring better skills through the benefit of living closely together and understanding ecological behaviour. This was the period in Kashmir when the cold glacial climate existed for longer durations than the warmer conditions and accordingly on occasions the climatic disturbances or hazards would have forced game to change its habitat in search of better living conditions. As such living in bands in the open or together in the caves would have meant next to nothing if there was no game to hunt in the nearby forests that were growing in extreme as well as in moderate climatic conditions.

The new geomorphologic setting after the drainage of the prehistoric lake would have brought game to the new environs on the freshly emerged landscape. With vast lands now available the chase was to become comparatively easier with tool types like points of the Upper Palaeolithic period, which could be used in hafted position and thrown at the prey to handicap its movements making for easier trapping. During the entire period of the Palaeolithic history of Kashmir animal resources were available to sustain man at all stages of development. He could even gather vegetable products of the forests, which today when they are shrinking at a rapid pace, provide an abundant variety of edible wild fruits, roots, herbs, grasses, etc.

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Chapter III

THE NEOLITHIC CULTURE

The most recent geological epoch, Holocene, saw the emergence of a new type of environment that was much more suitable and comfortable for the ecology and development of human culture. While a new bread of animals started to appear there was also qualitative change in the human behaviour. Accordingly the Palaeolithic Culture was followed by a more advanced culture represented by new types of stone implements meant not only for chase and hunting but for varied other types of works.

These tools were 'more skilfully made and more varied in form[1], and generally polished'[2] (ground). These represent an archaeological period that also saw introduction of agricultural practices, domestication of animals and manufacture of pottery.[3] This advanced prehistoric stage termed Neolithic Culture – the New Stone Age, is the final stage in the lithic industry.[4]

With the introduction of these steps man altogether transformed himself to abandon wandererism for settled life. Gorden Childe has termed it as 'Neolithic Revolution', as it is characterized by a 'vital transformation in human behaviour which initiated the first

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1 Palaeolithic Culture was followed, at places, by Mesolithic Culture having a new bread of microlithic tools that were mostly hafted for hunting to give an advantage to the man.

2 Sir John Lubbock in 1865 as reported by Lord Avebury, *Prehistoric Times*, London, 1865, pp. 2-3.

3 M. C. Burkit, *Our Early Ancestors*, Cambridge, 1926, pp. 50-57. Nevertheless at the earliest levels of this culture there are also aceramic horizons.

4 C. J. Thomson, 1846 divided the material culture into three ages, as Stone, Bronze and Iron, on the basis of material used for the fabrication of implements which followed one another in that order, c.f. G. Daniel, *The Idea of Prehistory*, London, 1962, p. 47. Sir John Lubbock (Lord Avebury, *Prehistoric Times*), further divided the Stone Age into Old Stone Age (Palaeolithic) and New Stone Age (Neolithic) denoting earlier and later ages respectively.

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economic revolution for humanity'[5]. Elaborating further, he says that food production is the deliberate cultivation of food plants especially cereals and the taming, breeding and selection of animals for domestication for which it was necessary to have knowledge of natural habitat and environment to tame and breed animals in continuous captivity. Accordingly, for the first time man ceased to be food gatherer and, instead, became food producer and thus chose a settled way of life.

The new economic factor, however, was not always the only source of subsistence, the earlier branches of economy, hunting, food gathering, etc remained economically important and useful if the conditions so required even if the essence of economic transformation remained vital[6]. The 'revolution' was not a sudden violent event; it was rather the culmination of a progressive change in the economic structure and social organisation of the communities involved.[7] Gorden Childe even said that it was also an 'Urban Revolution' where the affected changes brought about, besides other factors, the dramatic element of population growth. It was actually the innovation in the primary structure which influenced all the aspects of life as a result of which more people grouped into communities to live a settled way of life, to make innovations and possibility of specialization[8].

Such vital changes in the human behaviour and the socio-economic structure are also visible in Kashmir. These are known from the varied traces of material culture found at a large number of sites across the Valley. Archaeological investigations have revealed an extensive spread of Neolithic culture in the valley of Kashmir – see map on page 104. The culture generally speaking appears on the top of karewas in the loess deposits. Most of these sites are located near streams, rivers or lakes.

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5 Gorden Childe, *New Light on the Most Ancient East*, London, 1958, p. 23.

6 V. M. Masson and V. I. Sarianidi, *Central Asia: Turkmenistan before Achaemenids*, London, 1972, p. 33.

7 Gorden Childe, 'The Urban Revolution' *Town Planning Review*, Vol. 21, 1950, p. 3.

8 G. Childe, *Piecing Together the Past*, London, 1956, p. 87.

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The first site reported was Burzahom, in Srinagar, by de Terra and Paterson in 1935.[9] They also reported a settlement at Nunar, (then district Srinagar, now Ganderbal) where at a depth of 7 feet (2.1 meters) below the surface, a Neolithic level resembling that of the Burzahom cultural deposit was found. They also reported that Burzahom type of pottery was found (from the clay) at a depth of 20 feet (6.1meters) at the village of Baimlun in the Wangat Nallah in the Sindh valley[10]. Subsequent explorations revealed a large number of Neolithic sites in the Valley. Those carried on the Himalayan flank from Anantnag to Pampore have shown its cultural deposits at ten sites.[11] These sites are Begagund, Gofkral, Hariparigom, Jayadevi Udar, Thajiwor in tehsil Tral, district Pulwama; Olchibagh, Pampore, Panzgom, and Sempur in tehsil Pampore, district Pulwama .[12]

Such remains were also found at a site in Damodar Udar, 10 kms south west of Srinagar.[13] Along with other Neolithic assemblages, Kanyalwan in Bijbehara yielded pottery similar to those recovered at Burzahom.[14] Some ground stone tools were found at Gurhoma Sangri situated on a high terrace intruding into the Wular lake, about 48 kms north west of Srinagar, on the Srinagar- Bandipur road.[15]

Menhirs of Burzahom type were found at Begagund, Gofkral, Hariparigom, Pampore and Dadsar in Tral.[16] These were also found at Brah and Waztal near Martanda temple in Anantnag.[17]

Besides these, other sites subsequently reported were Singapore, Petha Gantamula and Kanishpora in tehsil and district Baramulla.[18] In Baramulla district other sites are Khor and Pattan in Pattan tehsil[19] and

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9 H. de Terra and T. T. Paterson, *Studies in the Ice Age.*

10 It was called Megalithic type on the basis of a type found at Burzahom.

11 *IAR*, 1962-63.

12 From the sites, burnished, coarse grey, combed and gritty red pottery was obtained. Among these sites 'dwelling pits' were found at Gofkral, Olchibagh and Sempur.

13 *IAR*, 1961-62, reports dwelling pits from the site.

14 *IAR*, 1976-77, reports period II and period III type pottery from the site.

15 *IAR*, 1961-62. These were a ground stone celt and a harvester.

16 *IAR*, 1966-67.

17 *IAR*, 1969-70.

18 *IAR*, 1981-82. From Kanishpora was collected a celt later on, *IAR*, 1985-86.

19 *IAR*, 1984-85

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Dillion (also called Chandigarh), Palapur and Gordan at Parihaspora of Pattan Tehsil.[20]

Besides these sites, from a cultivated field at Turkepur in district Baramulla, on Sopore-Bandipora road along Lake Wular were found two extraordinarily long celts, of which one is 40 cms and other 50 cms long (Pl. VIII). These celts, pecked, ground and polished, and having a unifacial bevelled cutting edge, were collected from the field when about 1.5 meters of soil was removed by the agricultural workers.[21] Above the cultivated field on the raised ground are found some remains of the Neolithic period including a large quern. Similarly a long celt, about 30 cms long, was also collected along with a sickle shaped sharp edged knife from Sombur[22]. Such assemblages provide an evidence of the Neolithic culture at these places.

In the Sindh valley, near the confluence of Krankindi and the river Sindh a Burzahom type settlement was found near village Kijpora.[23] Haribous in Tral, Borus in Avantipora, Kaneer, Budgam (Pl. X) and Aripanthan in Budgam and Kanishpora in Baramulla also yielded Neolithic pottery[24]. Further explorations yielded more sites from where different types of pottery were collected. These are Gopas-Udar, Kriri Chak, Kuladur, Mukam Udar, in Pattan tehsil, Raiteng, Tapribal, Wanigom, and Yohteng in tehsil Baramulla[25]; Pinglish in tehsil Tral, Balapur in tehsil Shopian, Romu in tehsil Pakharpur, Shah Pend in tehsil Pampore, Habashah Sahib in tehsil Tsodur, Hayatpur, Khan Sahib and Koshund in Biru tehsil.[26]

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20 *IAR*, 1985-86.

21 *IAR*, 1984-85

22 The tools were collected by Dr G M Bhat of the department of Geology, university of Jammu.

23 The site was explored in early eighties of the 20th century by Shri S. L. Shali of Centre of Central Asian Studies, University of Kashmir. It yielded an adze and grey-ware pottery.

24 Pottery collected from these sites by this researcher has been utilised in the figures drawn in the Chapter IV.

25 *IAR*, 1981-82.

26 R. K. Pant, *et al.*, *Man and Environment*, 1982, pp. 38-40. Of these sites, ochre red along with burnished ware is found only at Habashah Sahib whereas at Romu only gritty red ware is found. The rest of the sites have a mixed pattern of ceramic

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Similarly, Neolithic pottery was also found from a site located about 500 meters from Narastan temple in Tral,[27] (Pl. X) as well as from Dur village near Khan Sahib in Budgam.[28]

Some of the sites have aceramic horizons as well. Besides Gofkral, the excavations of the loessic profiles at Kuladur in Baramulla and Khan Sahib in Budgam have shown that Neolithic aceramic deposits were found below Neolithic ceramic horizons.[29] Such aceramic horizons are also exposed along the road cutting across loess at Pyath Pathur as well at Raiteng in Baramulla[30] thereby establishing that the Neolithic assemblages in the Valley was devoid of pottery in the earliest phase, which developed subsequently. Aceramic horizons are also found at the sites, which form a cluster, in and around Bomai in the Sopore tehsil. The famous Lake Wular is to the east of these sites from where all important and characteristic traits of the culture are found[31].

Of all these sites only two, Burzahom and Gofkral have been exposed archaeologically, the former extensively (Pl. IV), the latter only

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distribution in which course grey and burnished ware is found everywhere whereas combed ware and gritty red ware are found at some of the sites, see for details Chapter IV.

27 The site, explored by Dr. Kuldip Bhan, Department of Archaeology, M. S. University of Baroda in April 1982, has yielded combed ware.

28 The site 20 kms south-west of Srinagar is situated on the left bank of a tributary stream of river Doodganga on a karewa top and was explored by this researcher. Besides combed ware, there were found two mace-heads and fragments of a stone bowl and a part of quern.

29 R. K. Pant, *et al. Man and Environment*, Vol VI, 1982, p. 38.

30 *Man and Environment*, Vol VI, p. 38.

31 These include *wattle-and-daub* houses, sac-like storage pits, ground stone tools and all the four principal types of pottery, viz coarse grey, fine grey, black burnished and gritty red ware, Aijaz A Banday, "Preliminary Report: Archaeological investigations in Sopore" *Central Asian Digest*, Vol XXIII, Srinager,2003; "Neolithic settlement found at Bomai, Kashmir, India", *Circle of Inner Asian Art, Newsletter*, Issue 18, December, 2003, London. Besides Bomai (now called Bomai 8) these are found at Bomai 4, Botingoo 2, Botingoo 3 and Marg, Mumtaz Ahmad Yatoo, unpublished pre-doctoral thesis, *Archaeological explorations of Sopore and Bandipora tehsils in the district Bandipora, Kashmir*, submitted to the Centre of Central Asian Studies, University of Kashmir, Srinagar, May 2005.

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partially. The prehistoric site of Burzahom[32] in Srinagar, which is capped with eleven megaliths (Pl. V),[33] was first excavated on a small scale in 1935 by Hellmut de Terra; who came to the conclusion that the cultural remains of the site pertained to three different archaeological periods (Pl. IV). The earliest of these periods was Neolithic judging by the cultural remains found at the lowest habitational level, consisting of ground stone tools, bone tools and cooking pots (Pl. IX).[34] He could not assign a definite date to the archaeological period.[35] The next period was marked by the production of a copper pin and highly 'polished black ware'[36] some of which has incised geometric design and were assigned to the Chalcolithic period,[37] either to the early or the late Indus Valley Culture. The final third period was considered to be the early Historical as the pottery finds belong to the 3rd-4th century A.D.[38]

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32 Burzahom, lat. 30° 10'N and long. 74° 30'E, situated in the east of Srinagar on the Yandrahom karewa near the foot of Mahadeva mountain, is about 1.5 Kms away from the Dal lake and is presently surrounded by extensive rice fields fed by the waters of Telbal Nala, which flows on the north-east of the site, just below the archaeological mound.

33 Megaliths, meaning huge and large stones, formed a semi circle at the site. Most of these stones have fallen down haphazardly and the rest leaning awkwardly. Also called menhirs, the megalithic planted sites are mostly found in South India and are generally believed to be commemorative of dead human beings, S. P. Gupta, *Disposal of Dead and Physical types in Ancient India*, Delhi, 1972, pp. 80-92.

34 Hellmut de Terra and T.T. Paterson, *Studies in Ice Age*, pp. 233-34. The excavation, near the megaliths, in the loess without exposing the Upper Karewa reached up to a depth of 11'– 8" (3.55 m). At 7' (2.10 m) a kitchen layer 'K' with charcoal was located. This was superimposed by layer 'B' and layer 'A' together 2 to 3 feet (60-90 cms) thick.

35 This he said was because there was no known Neolithic site available in North India or could he relate Burzahom with the then known Mesopotamian Neolithic sites of 4000-6000 B.C., *Studies in Ice Age*, p. 234.

36 This is now correctly known as black burnished ware, infra this chapter.

37 Where copper/bronze replaces stone implements of previous age, progressively it is Chalcolithic or Bronze Age period.

38 This was related with the excavated site of Harwan near Srinagar; where from terracotta material of Buddhist period, mostly Kushan and post Kushan was found, see R. C. Kak, *Ancient Monuments of Kashmir*, New Delhi, 1971 edition, pp. 105-111.

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T. N. Khazanchi, who conducted large scale and extensive excavations at the site of Burzahom between 1960 and 1971, differentiated the cultural deposits of the site into four periods:[39]

i) Neolithic period – I
ii) Neolithic period – II
iii) Megalithic period
iv) Early Historical period

This periodisation was based on the results drawn from the study of several types of structural and other related material remains.[40]

Even though S. P. Gupta has subscribed to this periodisation yet he remarked that there was no marked difference between the Neolithic and the Megalithic periods as the implicit economy and occupational pattern suggest. The two periods, nevertheless, were distinguishable in terms of plantation of menhirs during the Megalithic period. In other words, the Megalithic period experienced an extension of the material culture that was already in vogue during the two Neolithic stages. This is why Gupta has called this phase of culture the Neolithic-Megalithic period.[41]

S. S. Saar, who remained associated with excavations at Burzahom for many years, has supported the four-fold division of the culture, but unlike Khazanchi has said that the Neolithic period I was aceramic in nature as no pottery deposits were found during the earliest period, hence called Aceramic Neolithic period.[42] Another co-excavator, R. K. Pant has also said that the first stage at the site was

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39 T. N. Khazanchi summarily reports the excavations in *Indian Archaeology – A Review* (*IAR*) 1960-61, 1961-62, 1962-63, 1964-65, 1965-66, 1966-67, 1968-69, 1971-72 and 1973-74. It is yet to be fully reported by the Archaeological Survey of India and thus technical details like stratigraphical data, quantum of material and structural details, etc. are not fully known.

40 Khazanchi was supported for this periodisation by one of his co-excavator, B. M. Pande, 'The Neolithic Culture in Kashmir – New Discoveries', *The Anthropologist*, Vol. 17, No. 1 and 2, 1970, pp. 25-41..

41 S. P. Gupta, *Disposal of the Dead and Physical Types in Ancient India*, pp. 82-83. A. Basu and A. Pal, too support the view of S. P. Gupta, *Human Remains from Burzahom*, Calcutta, 1980, p. 32,

42 S. S. Saar, *Archaeology: Ancestors of Kashmir*, 1992, New Delhi.

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devoid of pottery but he divided the cultural deposits into five periods as follows:[43]

i) Aceramic Neolithic period
ii) Early Neolithic period
iii) Middle Neolithic period
iv) Final Neolithic period
v) Early Historical period

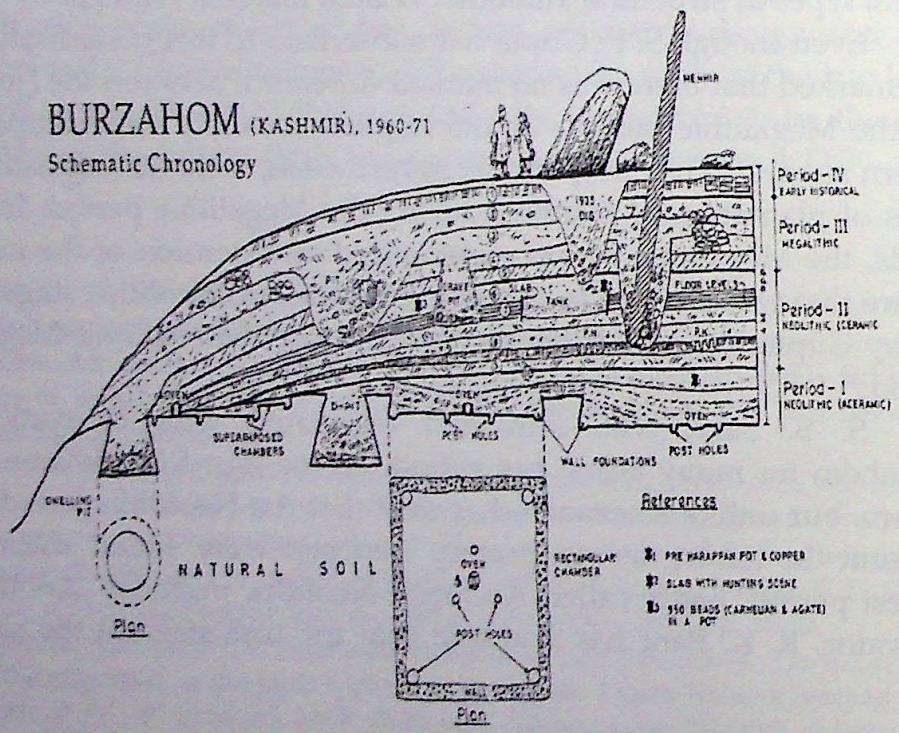

Fig. 30 Schematic chronology, Burzahom

Pant, like Saar, designated the first period Aceramic Neolithic, for there was no pottery found. He accordingly believed that pottery at Burzahom emerged and developed for the first time in the Early

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43 R. K. Pant, 'Kashmir Neolithic – A Re-appraisal' paper presented at XII Annual Congress of IAS and VII Conference of ISPQS, jointly held at Allahabad, Dec. 1981. Not in such details, this periodisation was later on carried over by R. K. Pant, Claire Gaillard, *et al*, *Man and Environment*, Vol. VI.

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Neolithic period and the two subsequent periods were marked by the appearance of totally new pottery materials or types. Like Gupta he did not separate the Megalithic period from that of the Neolithic period as it showed no material or economic differentiation.

The material remains at Gofkral site in particular and other sites in general[44] lend considerable support to Pant's scheme of five-fold periodisation as well as his consideration of the first period as Aceramic.

The site of Gofkral,[45] capped by menhirs like Burzahom, was excavated by K. D. Banerji and A. K. Sharma.[46] They divided its cultural deposits into three major archaeological periods as:

i) Neolithic period
ii) Megalithic period
iii) Early Historical period

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44 Pant, *et al*, *Ibid*, have reported that during their excavations of loessic profiles they came across the Aceramic Neolithic deposits which are devoid of ceramic industry but contain other Neolithic traits as at Kuladur, Khan Sahib, Pyath Pather, Raiteng Nala, Huin, Malapur, Batachak, and Nilanag.

45 Gofkral, lat. 33⁰ 54'N and long. 75⁰ 0' E. is situated adjacent to village Bonmir in tehsil Tral, district Pulwama, some 41 Kms south-east of Srinagar. In Kashmiri, 'Gof' is a cave and 'Kral' potter; and at Gofkral 35 caves have been excavated some time in the past, on the slopes of the Upper Karewa which are mostly occupied by the present day potters for the storage of their finished pottery. The archaeological mound measures 400 meters north-south and 75 meters east-west and is located some 35 meters above the road level. On the eastern side of the mound are found a few menhirs, none of them is in its original upright position. The archaeological mound being on top of the Upper Karewa is surrounded below by rice fields, *IAR*, 1981-82.

46 The site was first reported in 1962-63 by the Archaeological Survey of India and excavations were conducted almost near the centre of mound in 1981-1982 by K. D. Banerji and A. K. Sharma of the Prehistory Branch of Archaeological Survey of India and excavated about 100 sq. meters of the surface. It is briefly reported in *IAR*, 1981-82, 1982-83, without a full report. The above reports and papers by A. K. Sharma, 'Excavations at Gofkral', paper presented at XII annual congress at ISPQS, Waltair (AP), 29-31 Dec, 1981; 'Excavations at Gofkral' paper presented at XIII annual congress of ISPQS, New Delhi, 25-27 Oct, 1982; and 'Excavations at Gofkral – 1981' *Puratattva*, No. 11, (1979-80) 1982; "Neolithic Gofkral", *Central Asia and Western Himalaya- A Forgotten Link*, Ed G M Buth, Jodhpur, 1986; form the base of the details for our text on Gofkral excavations.

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The Neolithic period is further sub-divided into three stages as:

1) Aceramic Neolithic period I-A
2) Early Neolithic period I-B
3) Late Neolithic period I-C

This periodisation is based on the fact of absence of pottery in the period I-A and its appearance and subsequent development during the rest of the periods as well as on the basis of structural changes in the habitational apartments visible at different levels. Seemingly the periodisation proposed for Burzahom by Pant is in agreement with that of the Gofkral site. Even though the five-fold periodisation of Pant may be realistic yet one would face problems and difficulties in adhering to it.

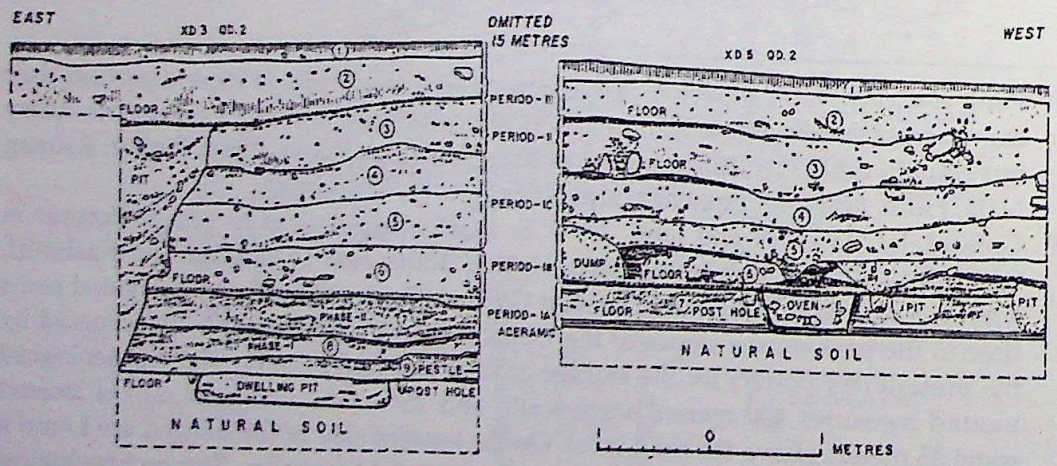

Fig. 31 Section drawing, Gofkral

In the first place, the material culture at Burzahom is separated on the basis of the four-fold periodisation. Secondly, Pant, who based his classification only on pottery, did not take into account the evolution of residential structures and rest of the other material culture for the differentiation of various periods. It is, nevertheless, certain now, particularly after the excavations at Gofkral and observations made at various other sites in Kashmir that the Neolithic Culture in the

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Valley had all the characteristic features of the archaeological period and to begin with pottery was not made. This is in spite of the fact that Khazanchi could not recognize it at Burzahom.

Considering the material culture, particularly the habitational constructions that were exposed pertaining to the period II at Burzahom, it becomes also evident that this stage has been divided by Pant into two periods, the Early and Middle Neolithic. It is reinforced by the fact that Banerji and Sharma also have divided the Gofkral material culture, following the Aceramic stage, into two periods, called Early and Late Neolithic. Megalithic period, at both the sites, is an extension of the Neolithic economy even though a new cultural trait in the form of huge megalithic stones was introduced, and therefore, there is seemingly no contradiction in labelling it the Final Neolithic period by Pant.

However, we find it difficult to divide the material culture exposed at Burzahom in four Neolithic periods for want of details based on stratigraphy. In view of lack of stratigraphical details, the standard periodisation adhered to in the present study would be that of Khazanchi and Banerji for the study of the material culture found at Burzahom and Gofkral respectively. Nevertheless help will be taken from the chronometric dates to make differentiations.

Chronology:

In the absence proper excavation reports of the excavated sites, radiocarbon (C^{14}) dates available from the two sites provide important information to arrive at a general time-bracket. The following estimated dates are based on 5730±40 years half life value of C^{14} wherein 1950 AD is the base year to convert these dates into BC/AD (BP). All these dates are basically uncorrected for C^{14}/C^{12} variations and the correction factor available (MASCA)[47] for BC radiocarbon dates are as such given in separate column.

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[47] All the C^{14} dates are measured after assuming that C^{14}/C^{12} ratio has remained constant in the atmospheric carbon dioxide. However, dendrochronology, the tree ring dating, of sequios (*Sequais gigantea*) and bristlecone pines (*Pinus aristata*) have shown that the assumption (C^{14}/C^{12} ratio) is not strictly valid. Therefore, corrections have been applied to radiocarbon dates to adjust them with dates

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Burzahom dates		
Period	**C^{14} date[48]**	**MASCA date[49]**
Neolithic I	2225 ± 115 BC	2650-2780 ± 125 BC
Neolithic II	2100 ± 115 BC 2025 ± 350 BC 1825 ± 100 BC 1850 ± 125 BC 1542 ± 108 BC 2375 ± 120 BC	2550 ± 125 BC 2340 –2460 ± 360 BC 2120-2140 ± 110 BC 2160 ± 135 BC 1720-1760 ± 120 BC 2920-2940 ± 130 BC
Megalithic	707 ± 103 BC	800 ± 103 BC
Gofkral dates		
Period	**C^{14} date[50]**	**MASCA date**
Neolithic I A	4420 ± 1i0 BP 3130 ± 100 BP	2990-3060 ± 110 BC 1340 – 1370 ± 110 BC
Neolithic I B	3980 ± 120 BP 3570 ± 110 BP 3470 ± 110 BP	2350 – 2460 ± 130 BC 1920-1950 ± 120 BC 1710-1750 ± 120 BC
Neolithic I C	3570 ± 100 BP 3340 ± 100 BP 2790 ± 110 BP	1920 – 1950 ± 120 BC 1600- 1630 ± 120 BC 1030 – 1080 ± 120 BC

The corrected C^{14} dates give the earliest date of 2650-2780 BC for the period I at Burzahom. However, the sample collected for the chronometric dating is not from the base of the habitational deposit of

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attained after using dendrochronology, called MASCA (after Museum Applied Science Centre), in the laboratories at University of Arizona, California and Pennsylvania USA, Elizabeth K. Ralph, H. N. Michael and M. Han, 'Radiocarbon dates and reality', *MASCA Newsletter*, Vol. 9, No. 1, The University Museum, Pennsylvania, Philadelphia, 1973, pp. 1-20.

48 D. P. Agrawal and S. Kusumgar, *Prehistoric Chronology and Radiocarbon dating in India*, New Delhi, 1984, p. 68. The dates were measured by Tata Fundamental Laboratory.

49 The dates are after Elizabeth K Ralph, H. N. Michael and M. Han, *MASCA Newsletter*, who presented the corrected dates from 1840 AD to 4760 BC both in calibration curve and table form.

50 The Gofkral C^{14} dates were estimated at Birbal Institute of Palaeobotany, Lucknow, *IAR*, 1982-83, p. 147; A. K. Sharma, *Puratattva* and "Neolithic Gofkral", *Central Asia and Western Himalaya- A Forgotten Link*, Ed G M Buth, Jodhpur, 1986, pp13-17.

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the period; the earliest period may have, therefore, started still earlier. The date of 1340-1370 BC from the Gofkral period I-A is not in conformity with the other date of the period, 2990-3060 BC and therefore has some kind of an error. Nevertheless, considering the amount of habitational deposit of the Aceramic period, which is far greater than any other period at the site, it demonstrates that the Aceramic period existed for much longer time than any other period there.[51] The date of 2990-3060 BC from the site as such allows to hold that the Aceramic period at Gofkral started sometime around the end of the 4th millennium BC which may have been the case at Burzahom as well given the similarity of the archaeological material at the two sites.

The collaboration comes from C^{14} date from the Aceramic Neolithic horizon at Pyath Pathur in District Baramulla. It is dated to 4310 ± 150 BP (2350 BC)[52] which on correction factor gives the date of 2920 ± 160 BC. Further evidence to this account that the period was earlier than the rest is provided by the chemical analysis of bone samples collected from Gofkral. The analysis has shown deposition of a higher percentage of fluorine content in them during the Aceramic period than the rest of the periods,[53] when fluorine as a rule grows constantly with age.[54]

The C^{14} dates are quite regular for the succeeding Neolithic period which began around 2500 BC and continued till about 1700 BC at Burzahom whereas period IC at Gofkral may have began around 2000 BC to end around 1700 BC, as at Burzahom. The C^{14} date of 2920-2940 BC of period II at Burzahom may be aberration as all other dates are found to be consistent. Similarly 1030 BC from period I-C at Gofkral may actually be of the Megalithic period as a similar date of 800 BC from Burzahom marks this period.

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51 A. K. Sharma, *Puratattva; IAS and ISPQS*, Oct. 1982, New Delhi.

52 *IAR*, 1982-83, p. 142.

53 Chemical analysis of the bone samples was done by Smt. A. A. Kashirsagar of the Deccan College, Pune; A. K. Sharma, *Puratattva*.

54 Flourine ions, when come in contact with the burial bones, are absorbed and locked in the bones by the replacement of hydroxyl ions and accumulate progressively. The difference in the percentage of the fluorine accumulation buried in a particular deposit determines the differences in the age of the deposits.

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The dates provide a general time bracket of 3000-1700 BC for the Neolithic periods; and for the Megalithic period, following without any break, there are not many C^{14} dates available to mark its exact time bracket. Yet the two dates showing the end of the Neolithic stage at Burzahom and Gofkral, of 1600-1700 BC indicate that the Megalithic period did start around that time and may have continued till about 1000 BC. These dates, therefore, provide a general time-frame for various stages of the Neolithic period which as given below have been used for over-simplification in this work:

Time Bracket	Burzahom	Time Bracket	Gofkral
3000 – 2500 BC	Neolithic I	3000 - 2500 BC	Neolithic IA
2500 – 1700 BC	Neolithic II	2500 - 2000 BC 2000 - 1700 BC	Neolithic IB Neolithic IC
1700 – 1000 BC	Megalithic	1700 - 1000 BC	Megalithic

The excavations at the two sites have produced remains of a lot of material culture. Most of this is in the shape of tools and implements that was in use during the time. Besides, the excavators were able to record the details of the habitational structures built at different stages of the culture. An account of the structural remains as exposed at the two sites is given below:

i) Pit Structures of 3000-2500 BC:

Both at Burzahom and Gofkral the earliest type of habitational units were pit structures. These were cut below the ground level in the natural soil.[55] The pits were of two types (i) circular or oval shaped deep pits, and (ii) square or rectangular shaped shallow pits. Khazanchi labelled the former as dwelling pits and the latter pit chambers. He

[55] T. N. Khazanchi in his first report, *IAR*, 1960-61, p. 11, said that these had been dug in the Upper Karewa the natural soil there. But the natural soil in which the Neolithic habitation lived at Burzahom is loess which is what has been also attested by B. M. Pande, *The Anthropologist*, p. 24.

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noted that both types of pit at Burzahom were used for dwelling purposes and their inhabitants, as such, were christened pit-dwellers.[56]

The pits were spread all over the site at Burzahom, but circular pits were found mostly to be located near the borders of the site while the square types were generally concentrated in the central area of the site.[57] Varied in their depth, these pits were dug out in the loess deposits with the help of long celts/picks – a fact attested by the trace marks of the cuts affected in the soil of their walls, which are still traceable.[58]

The circular pits were well-like structures, conical in form, narrow at the top, wide at the base (Pl. VI) and varied in depth, on an average between 1.5 to 2.5 meters. At Gofkral their diameter on an average at the top was 1.5 meters and 3.8 meters at the base, while at Burzahom the largest of these pits measured 2.74 meters at the top or mouth, 4.57 meters at the base or floor and 3.95 meters in depth.[59] It was found at Burzahom that the deep circular pits had upto three landing steps (Pl. VI),[60] cut in their sloping walls, which were called to have served as a staircase. However, as these landing-steps, reach from the top of the pit to a depth of only 1.20 to 1.50 meters, it is conjectured that the inhabitants used some other means, like a wooden ladder, for further access.[61]

The belief that these circular pits were made and used for dwelling purposes is based on the finding of certain arrangements within these pits that could have facilitated dwelling in these pits. The evenly made floors as well as in some cases portions of wall surfaces of

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56 T. N. Khazanchi, 'Pit dwellers of Burzahom' *The Illustrated Weekly of India*, Sept. 5, 1976, pp. 25-27.

57 R. N. Kaw, 'The Neolithic Culture in Kashmir' *Essays in Indian Protohistory*, eds. D. P. Agrawal and D. K. Chakraborti, *1979*, New Delhi, p., 222; S. S. Saar, *Archaeology*, p. 17.

58 T. N. Khazanchi, *The* Illustrated *Weekly of India*, p. 26. Many such examples are still found at Burzahom which bear the trace marks of the tools that were employed for the digging of these pits.

59 *IAR* – 1961-62.

60 The number of landing steps depended upon the depth of the circular pits but their number in no case was more than three.

61 *IAR*, 1961-62; T. N. Khazanchi, *The Illustrated Weekly of India*, p. 26.

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the pits were mud plastered. Moreover, some pits were provided with niches or alcoves in the walls and, in one case at Burzahom, two adjacent pits were found interconnected by an arched corridor, plastered with mud (Pl. VI). Besides, in many of these pits were found some utility objects like stone and bone tools, hand made pottery, ash and charcoal, suggesting human occupation.[62]

Each of these circular pits was provided with a cover of roofing above their mouth which was supported by wooden posts – a fact evident by the presence of post holes which were found at intervals along the periphery of the mouth. The roofing cover, which might have been conical in shape[63], was presumably made of perishable material, like hay and birch bark[64] as many of the pits contained birch-bark pieces, burnt or otherwise, together with pieces of charcoal and ash at Burzahom. That these circular pits were meant for dwelling purposes, significantly finds further support from the presence of hearths or ovens near the mouth of these pits. These hearths, made either of stones or bunding of mud, were surrounded by three to four post holes, suggesting a roof cover on wooden posts for these fire ovens.[65]

This phase of pit dwelling seems to have lasted for a considerable period of time as is indicated by the findings of three succeeding occupational layers at Burzahom.[66] The noteworthy feature of each succeeding occupational layer is that the pit size became progressively larger, retaining all the above mentioned arrangements and facilities, that were necessary for residential purposes.

These residential facilities were further improved by digging storage pits near the dwelling pits. These storage pits too were conical in form, narrow at the top and wide at the base but were small and shallow and varied between 60-90 cms in diameter. Like the circular

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62 IAR, 1960-61, 1961-62.

63 Bridget and Raymond Allchin, *The Birth of Indian Civilization*, London, 1968, p. 111

64 Birch in Kashmiri is called 'Burza', and as such possibly the site carries the name from the Neolithic times on account of its extensive use for the roofing. However, the same material was used extensively for the roofing of houses in Kashmir till the use of galvanized iron sheets in the middle of the 20th century.

65 T. N. Khazanchi, *The Illustrated Weekly of India.*

66 *IAR*, 1973-74.

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pits, they too were provided with roof covers on wooden posts. A proof of these being meant for storage purposes is that these pits contained such material as animal bones, broken pots, bone and stone tools, broken or otherwise, charred hay, birch bark and burnt clay.

As compared to the circular pits, the pit chambers were of a different type of habitational structures.[67] They were square-shaped, and shallow in depth averaging between 0.30 to 1 meters at Burzahom while at Gofkral their average depth was about 0.20 to 0.30 meters. The largest of these, commonly called a community hall, located at the centre of the site at Burzahom, was a square of 11.0 meters, while the common types were 6.40 x 7 meters in size.[68] Above the ground level, each pit had a superstructure mainly built on wooden posts (Fig. 32). These posts were driven at intervals in the floor of the pit chamber along its periphery on all sides. The intervening spaces between the posts were made of wattle-and-daub to form the compact walls of the pit chamber.[69] The corner post-holes of the chambers being comparatively deeper and wider suggesting thereby that corner posts were stronger to support a sloping roof.[70]

A shallow drain which ran along the external periphery of the chambers, in all probability, was used as a means to stop rain water entering the chambers, thus saving the walls from soakage. Internally the earth walls of the pit chambers were plastered with mud. Likewise their floors too had mud plaster while in some cases the floors bore a coating of red ochre. Gofkral had two occupational levels at this stage. In the first one (Phase I) the floors of the chambers, storage pits and the working area around them were plastered and painted with red ochre paste. Such a feature was absent in the second occupational layer (Phase II). Not only were some of the earlier pits (Phase I) enlarged but some of the pit chambers were partitioned to make them two-chambered during the second occupational level (Phase II).

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67 *IAR*, 1966-67. During this season's dig such structures were reported for the first time, even though, S. S. Saar claims that these were found after the first two years dig, *Archaeology*.

68 *IAR*, 1966-67; S. S. Saar, *Archaeology*, p. 18.

69 S. S. Saar, *Archaeology*, p. 18.

70 T. N. Khazanchi, *The Illustrated Weekly of India*, p. 26.

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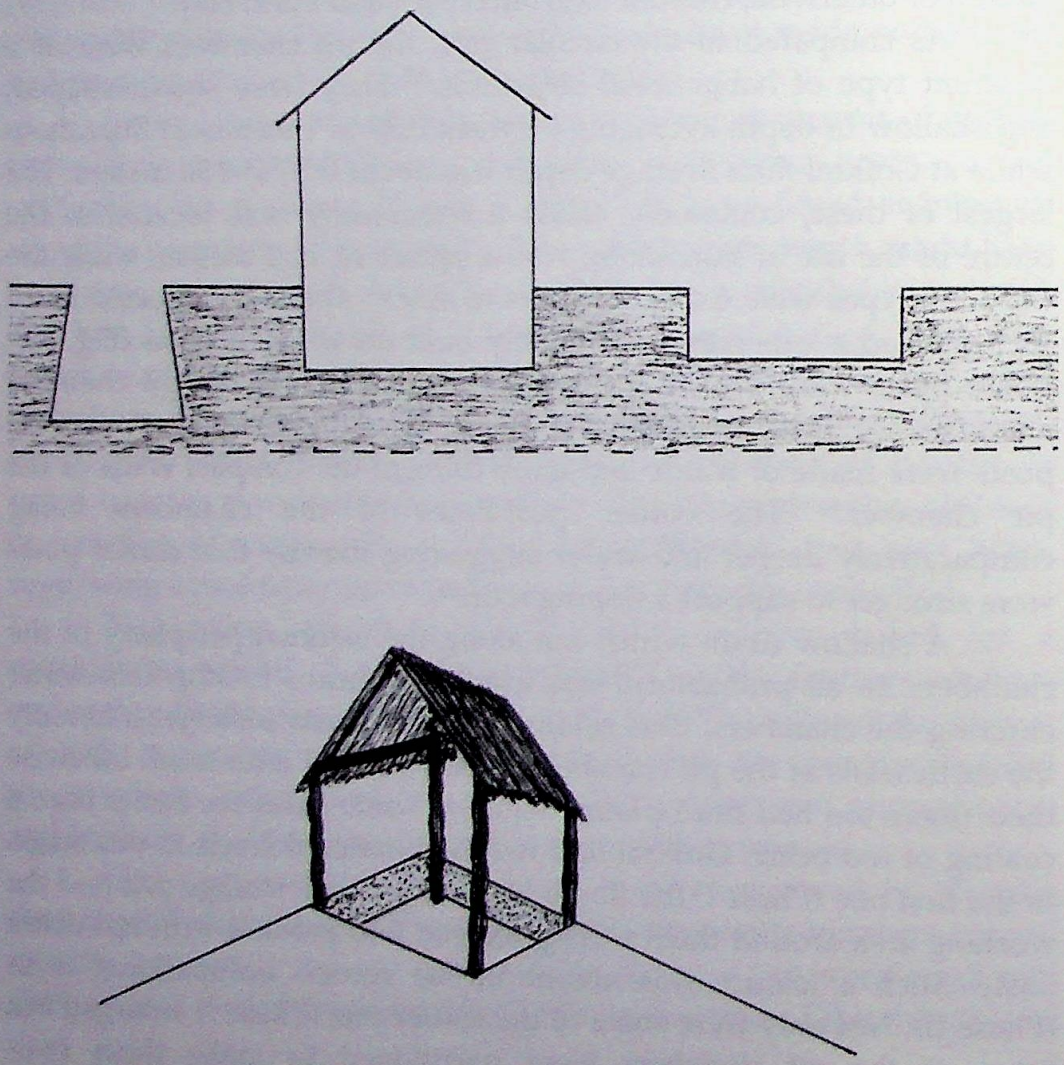

Fig. 32 Alignment of Pit –Chamber and storage pit

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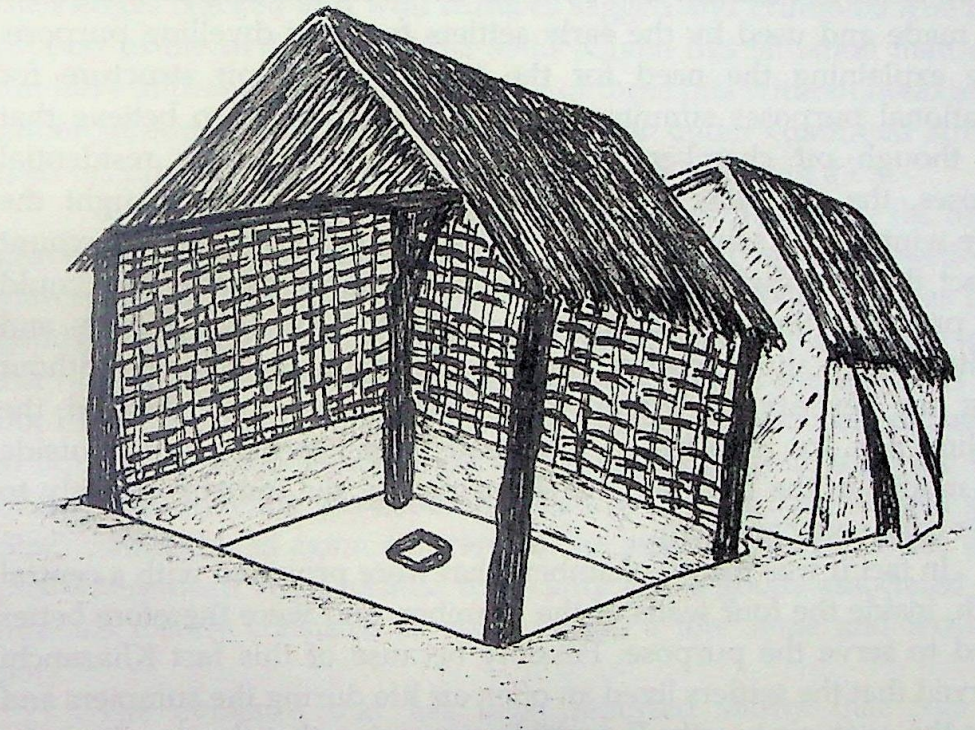

Fig. 33 A view of inside of a Pit-chamber with a oven in the centre

Generally at the centre of the floor of each pit chamber there was placed a hearth, lined with clay (Pl. VII). Such hearths mainly contained ash and burnt clay. Around these hearths were found three to four post holes,[71] possibly to facilitate erection of conical shaped wooden tripods over the ovens for roasting animal meat. Within the chambers there was also sometimes marked a separate space for storage. Like at Gofkral (phase II), some of the pit chambers at Burzahom were partitioned to make them two chambered. That these semi-

71 *The Illustrated Weekly of India;* S. S. Saar, *Archaeology*, p. 18.

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subterranean chambers were used for dwelling purposes is proved not only by the above mentioned habitational arrangements but also by the finds of utility material within these chambers consisting mostly of stone and bone tools.

The details given by the excavators of the pit structures have allowed them to establish that both the dwelling pits and pit chambers were made and used by the early settlers for their dwelling purpose. While explaining the need for the two types of pit structure for habitational purposes simultaneously, Kaw makes us to believe that even though pit chambers were more comfortable for residential purposes, the dwelling pits were nevertheless devised to fight the severe winters of Kashmir.[72] This explanation fails to take into account the fact that the dwelling pits contained no inner hearths that could have provided the desired warmth to combat the cold winters and simultaneously allow food to be cooked within the abodes without facing the severity of winter conditions in the open. Instead the dwelling pits are reported to have had their hearths placed outside their mouth in the open air thereby exposing the inmates directly to winter cold, snow and rain.

In fact it was the pit-chambers that were provided with a central hearth, inside the four walls of the chamber, and were therefore better placed to serve the purpose. Possibly because of this fact Khazanchi observed that the settlers lived an open air life during the summers and hence the open-air hearths,[73] possibly conveying that the dwelling pits were rather suitable for the summers. Contrary to this position, Saar made some interesting observations. He held that only square-shaped pit chambers were meant for dwelling purposes whereas the circular shaped pits, on the other hand, were neither compact habitational unit, nor the hearths, placed near their mouths, part of these pits.[74]

In defence of this position Saar argued that the drain-like elements at right angles to the mouth of the circular pits,[75] including the

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[72] R. N. Kaw, *Essays in Indian Protohistory*, pp. 221-22

[73] T. N. Khazanchi, *The Illustrated Weekly of India*, 26.

[74] S. S. Saar, *Archaeology*.

[75] It is for the first time that this is being reported, S. S. Saar, *Archaeology*, p. 7; T. N. Khazanchi in his reports, *IAR*, does not mention it.

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hearths placed near their mouths were actually the ghost alignments of once abandoned pit chambers on the floors of which these circular pits were dug out. He observed that these circular pits were neither suitable nor maintainable for dwelling purposes as it became evident, soon after they were exposed during the archaeological excavation, that their edges cracked and wall surfaces sagged and crumbled due to the process of the drying up of the soil.[76] Given this situation man could not have afforded to climb in and out of these pits without breaking the undercut edges, which were rather weaker under continued stress of their occupants, thus making it uncomfortable to live in them.

To explain their utility Saar has said that these were the human grave pits of the Neolithic period I. In support of this assertion he viewed all of the utility material found in these circular pits as grave goods; wherein, however, no human burials were found. It may not be out of place to mention here that the excavators at the two sites have not found any kind of burial arrangement for the said period but only at Burzahom in the Neolithic period II and the Megalithic period some of the dead humans were found buried in circular cone shaped grave pits[77]. And this is again contrary to the assertion that in those grave pits where dead were located the scanty grave goods associated with humans merely consisted of some beads, a few stone and terracotta pots.[78]

The evidence that has been reported shows that Saar has misinterpreted the archaeological evidence in respect of the circular shaped pits of the period I by regarding them as burial pits. None of them in fact contained any kind of funeral materials and wherever it was found belonged to the succeeding periods and was entered along with the dead. What in fact he makes to believe is that a large number

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76 There are still a few exposed circular pits at the site which do not show any sort of such damage after about 30 years of archaeological excavation, except what is expected due to the wear and tear of visitors at the site.

77 A Basu and A Paul report only ten grave pits in which human skeletons were found which belonged to the Neolithic period II and the Megalithic period at Burzahom; *Human Remain from Burzahom*, p. 4 .

78 A Basu and A Paul, *Ibid.*

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of circular shaped grave pits were dug in advance for the expected dead, in which was kept their future grave goods[79].

It seems quite implausible to locate the grave furniture in the empty graves, even if it is presumed that all of these circular pits were actually dug-out grave pits. Further, the grave pits could not have the arrangement of roofing covers that was supported on wooden posts at their mouths. Neither such covering is known on the grave pits with human remains of the subsequent periods[80].

Even though Saar could not logically justify the need to have circular pits at the same time as square shaped pit chambers were used for residential purposes at Burzahom, his observations regarding the ghost alignments and maintainability of these pits during their constant occupation by the habitants are still worthy of consideration and his arguments in this regard are more scientific. He finds partial support from Pant, who likewise ruled out the possibility of the circular pits having ever been used as dwelling units; however, contrary to Saar he argued that they were actually the remnants of storage pits of the later Neolithic periods {Middle (III) and Final (IV) of Pant's classification}.[81]

The assignment of these circular pits to the later Neolithic periods was made on the basis of his observation of the presence of a particular type of pottery in them which belonged to the advanced stages of the culture. Their assignment to the later periods seems quite unreasonable if the archaeological and stratigraphical evidence has been correctly presented, which we believe is the case. The mouths of

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[79] The exact number of circular pits found during the excavations of T. N. Khazanchi is not known, but only in the season of 1961-62, 16 such pits were unearthed, *IAR*, 1961-62. The number of unearthed pits as such would have been large enough and still more if we count those along the periphery of mound which got exposed due to the earth cuttings there in 1982, ten years after the excavations were completed in 1971 and these too did not contain any kind of funerary material.

[80] No roof cover was found in the grave pits at Burzahom. In fact these grave pits were dug out in the floors of the houses of their respective periods and once a dead man was buried, these were filled with earth to cover the dead.

[81] R. K. Pant, *IAS and ISPQS*, 1981; K. N. Dikshit, without mentioning to which period these belonged, also holds that these are simple storage pits having no direct connection with dwelling purposes 'The Neolithic Cultural Frontiers of Kashmir, *Man and Environment*, Vol. VI, 1982, p. 35..

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these pits in many cases both at Burzahom and Gofkral, particularly those located near the centre of the site at Burzahom, were found sealed by compact floors of the houses of the succeeding cultural stage,[82] implying that the pits were made by the forbears of those who raised the houses on them with compact floors, and thus belonged to the Aceramic period. Since it is also reported that 96% of the total circular pits were without the deposits of pottery,[83] it adds weight to this inference. It is also a fact that such pits were located on the slopes of the archaeological mound at Burzahom where no subsequent habitational units were built to seal them during the advanced stages; therefore, it is very likely that the pottery, wherever found, was washed away from the upper reaches of the mound.

Given this fact, it seems very reasonable to conclude that the circular pits were actually the storage pits of the Aceramic people who lived in square pit chambers only. And what appeared to Khazanchi the landing steps in the deep circular pits, were in fact the relic floors of the subsequently made storage pits and were thus formed on account of the continuous digging of storage pits during the successive occupational levels of the period I (Pl. VI).[84] And the hearths and their post holes found near their mouths were certainly the ghost alignments of the erstwhile chambers, in whose floors they were dug out, as has been pointed out by Saar.

ii) House Structures of 2500-1700 BC:

During this period the earlier pit structures were abandoned, filled up and in their places square or rectangular shaped houses were raised completely over the ground. The floors of these houses were

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82 *IAR*, 1961-62.

83 S. S. Saar, *Archaeology*, p. 17. T. N. Khazanchi earlier reported (*IAR* 1960-61) that these contained hand made pottery which he however describes together with the pottery of the Neolithic period II (*IAR* 1961-62) without identifying these separately.

84 Three such occupational levels were reported from this period at Burzahom (*IAR* 1972-73) and the number of landing steps, in general, was three in the deep circular pits; thereby indicating that on three occupational stages the same pit area was dug to make the storage place which would not have been traversed as frequently as a dwelling pit to cause any damage to the undercut edges.

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made of rammed earth mixed with ash and charcoal. These floor platforms were subsequently plastered with mud and painted with a coat of red-ochre at Burzahom. Gofkral houses at the earliest stage (2500-2000 BC) had 5 to 7 cms thick floors, made of compact yellow clay mixed with 'lime'. It seems that these houses were under extensive use which is why their floors were repaired at least 5 or 6 times during their occupations. Over these floors were raised superstructures mainly on wooden posts which were driven at intervals in the floors of these houses.

There is no evidence as to how the gaps between the wooden posts were abridged, nor do we know anything about the material used for the roofing of these houses. However, the bulk of the burnt wooden materials recovered from many of these houses at successive intervals are indicative of incidence of fire as well as suggestive of the fact that wood may have been used extensively for these structures. Gofkral excavations are suggestive that the intervening space between the posts was filled up with reeds, to form wattle-and-daub walls. The chunks of burnt clay with deep and wide reed impressions found on their floors are also indicative of the possibility that the houses were destroyed due to recurring fires – a fact also found at Bomai. At the same time, besides wooden houses, some houses at Gofkral were found to have been made of mud and rubble.[85] There is no such evidence available which could indicate the type of roofing material employed.

Apart from these house types, a circular deep pit cut through the rammed earth was also found there, which had a mud plastered circular entrance. On one of its sides were some landing steps, cut differently to those found at Burzahom during the Neolithic period I. The purpose of this pit is not known.

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[85] One such instance showed that two compact walls of mud, mixed with 'chunam' running parallel to each other, 10 cms uniformly wide throughout and having same space in between, were raised. The nature of this construction is not exactly known for reasons that most parts of it were not excavated, A. K. Sharma, *Puratattva*, No. 11.

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Some of these large houses were even partitioned to make them multi-roomed structures.[86] There is also evidence that on the prepared platforms, of rammed earth and mud, houses were built of mud or mud bricks at Burzahom.[87] We do not however know whether there were any wooden posts used along with the mud and mud bricks for their construction.

In each of these houses was placed a fire-oven. One such large oven was in the form of a deep and wide pit, having a charred lining, in which was found a large number of animal bones especially of deer indicating thereby that the oven pit might have been used as a communal hearth.[88] Communal living is also attested to by the find of a large community house belonging to this period.[89]

In some cases these houses were provided with storage pits which were dug adjacent to the houses and had an average diameter of 1.04 meters. It seems that these settlements survived for a long period as several of their occupational levels were found at Burzahom.[90]

At Gofkral between 2000–1700 BC, besides the houses in wood, mud and rubble, some circular houses were made extensively of mud, along with circular storage pits were also dug, but there was no provision in them for the raising of roof covers on wooden posts set along their periphery like that of the storage pits belonging to the earlier period. It, therefore, strongly suggests that their mouths were covered by a removable roof cover.[91] At this point of time the

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86 There is no mention of the number of the rooms that were created because of the partitions.

87 It is only in the first year's report (*IAR* 1960-61) that mud or mud brick houses are mentioned while as in the subsequent reports these are not repeated. However, Khazanchi repeats their mention again in 1976, *The Illustrated Weekly of India*, p. 27.

88 *IAR*, 1960-61.

89 *IAR* 1961-62. It seems to have been partly excavated by the time the report was sent for its publication as the dimension 3.94 x 1.20 meters do not make it large structure nor does the number of 45 post holes almost in straight alignment suggest so. In the subsequent reports it is not repeated and, therefore, it does not look to be a community house but a common house.

90 *IAR*, 1961-62. However the number of occupational levels is not recorded.

91 A. K. Sharma, *Puratattva*, No. 11.

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inhabitants at Gofkral were found to have made a large number of refuse pits for refuse dumps.

Along with these houses a rectangular structure formed of upright stone slabs (Pl. VIII) filled partially with fine sand was also traced out at Burzahom.[92] The structure is described as a tank[93] and one wonders, if the presence of the sand was meant for filtering water in it.

iii) House Structures of 1700-1000 BC:

During the period various occupational levels were traced at the site of Gofkral, each of them bearing the remnants of house floors, but there is no evidence which could bear upon their superstructures. The inhabitants of this period at Gofkral seem to have used these houses for a pretty long period of time, which is why the existence of a large number of refuse pits was found, sunk deep into the natural soil and from which all kinds of refuse, like large quantities of potsherds and discarded animal bones, were recovered.

At Burzahom it has been found that the structures of the previous type built on wooden posts continued to remain in vogue during the period, yet a new style of house construction was introduced by way of raising neatly built rubble walls (Pl. IX). Some of these rubble structures seem to be huge and roughly semi-circular.[94]

Besides, the people also erected massive and large sized menhirs (Pl. V), planted in deep and wide pits which were themselves cut in the floor levels of the previous period. These menhirs were kept erect with a dry packing of rubble. At Gofkral the menhirs were planted in shallow pits with the help of broken pebbles.

iv) Grave Structures of 2500-1000 BC

The information regarding the graves of humans and animals for the disposal of the dead is known from the archaeological remains of

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[92] B. M. Pande, 'Neolithic Hunting Scene on a Stone Slab from Burzahom, Kashmir' *Asian Perspective*, Vol. XIV, 1971.

[93] T. N. Khazanchi, *The Illustrated Weekly of India*, p. 27.

[94] One such structure was built on the filled up circular pit of Neolithic period I, however its exact plan is not complete but seems it had an opening on the south east, *IAR*, 1961-62.

Kashmir Treasure Collection.Digitization by eGangotri

Burzahom pertaining to the Neolithic period II and the Megalithic period.[95] During these two periods circular shaped grave pits were dug for the burial of the dead. These pits were narrow at the top and wide at the base, measuring 1.17 meters and 2.03 meters in diameter respectively. The graves were found within the habitational area, mostly underlying the floors of the houses at a depth ranging from 1.20 to 2.90 meters. Their wall surfaces were often plastered with lime; and, after the burial of the dead, were filled with earth mixed with ash, stone pieces and potsherds. Besides the burial of humans, some of these graves were also used for the burial of animals. However, there were also separate graves for animals which likewise were located in the habitational area and looked alike in form. The detail of the burials is given below.

Human burials:

Neolithic human skeletal remains were found at Burzahom, while at Gofkral the year-long excavation of about 100 square meter area revealed none. Most of the Burzahom skeletons were more or less complete and all of them were individual burials. Sharma reports that in all, nine human burials were excavated, of which six belonged to the Neolithic period II, and three to the Megalithic period,[96] whereas Basu and Pal, who carried out anthropological studies on these skeletons, state that ten burials were found, of which seven belonged to the period II, and three to the Megalithic period.[97] However, neither report mentions which of the skeletons belonged to what period. These are

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95 *IAR*, 1962-63. There is no evidence how the dead people at the site were disposed off during the Neolithic period I.

96 A. K. Sharma, 'Neolithic Human Burial from Burzahom, Kashmir; *Journal of Oriental Institute of Baroda*, Vol XVI, No. 3, 1967, pp. 239-42. *IAR*, 1962-63 gives their number eight, five of the Neolithic period II and three of the Megalithic period. B. M. Pande maintains the number of burials was in all nine and also says that the one found below the menhirs, of an adult male reclining on the back (Burial no. 8 in our text) was wrongly taken to be of the period II in the *IAR*, 1962-63, while this is actually of the Megalithic period as reported correctly by Sharma, pp. 241-42.

97 A. Basu and A. Pal, *Human Remains from Burzahom*, p. 3. This work and that of A. K. Sharma form the material for the text.

Kashmir Treasure Collection.Digitization by eGangotri

described here period-wise using the two reports as the basis of discussion.

It has been maintained that the distinctive feature of human burials of the period II was the use of red-ochre paint on the bones, and generally a north-east to south-west or a south-east to north-west orientation. Both the reports maintain that during the period II two of the burials were fractional or secondary and the remaining were primary articulated burials. As we have given their details in the period wise order, therefore, we have put the numbers allotted to them by the excavators in the brackets to avoid confusion.

Neolithic Period II:

Burial 1: This was a primary articulated burials of a child (skeleton No. 2), kept in a flexed or fetal position (Pl. XII). It was lying on its left side with its head placed towards the west giving a west-east orientation. The milk teeth could be seen distinctly. The grave pit of the child was found just below the left foot of an adult male of the Megalithic period and was sealed by the thick yellowish floor of a hut.

Burial 2: This adult female (skeleton no. 8) was lying on its left side in the south-east to north-west orientation. The body was flexed, in a crouching position with the arms raised up to the head and the palms covering the face (Pl. XII). The lady had five carnelian barrel-shaped beads near the neck region, possibly representing a neck ornament the lady was wearing when she was buried. The grave pit 3.15 meters below the surface level was dug 2.8 meters deep in side the house.

Burial 3: This adult lady (skeleton no. 7) was placed in the north-east to the south-west orientation, resting on its right side, the skull leaning towards the north-east. The skull has seven finished and four unfinished holes in the normal laterals position on the parietal bone between bregma and lambda. These are trepanations (Pl. XIII). The body is in a crouching position, like that of the Burial 2. In the grave pit was found a soapstone circular disc bead. Animal bones and antler horn pieces were also recovered at various levels of the grave. An animal jaw was found painted with red ochre. The grave pit was 2.33 meters deep and was plastered internally with lime and sealed by a yellowish floor.

Kashmir Treasure Collection.Digitization by eGangotri

Burial 4: The adult burial (skeleton no. 10) was in an extended primary articulated position. It was in a south-west to north-east orientation, unlike the other burials of this period. The skull had been found considerably damaged, possibly on account of stone pieces thrust inside the grave, as these stone pieces were found in the grave filling. A circular stone bowl was also buried along with the body as grave good. The grave pit was dug into an earlier 'dwelling pit' which contained a profuse quantity of pot- shards.

Burial 5: This adult (skeleton no. 9) was found in a primary articulated position. No other details of this skeleton are available.

Burial 6: This was a secondary burial (skeleton no. 5). The body is partially articulated, in a south-east and north-west orientation. The skeleton seems to have been buried earlier in a flexed position. In its secondary state, the hands and legs of the skeleton were folded up at the ankles and knees (Pl. XII). A small barrel-shaped paste bead was found in the grave, while outside the grave, but in the same layer, a terracotta pot filled with red ochre was found. In the grave itself two long conical stones were placed in an inclining position towards the leg on the top of the pit. The grave was dug 1.25 meters deep and plastered internally with lime. The pit was sealed by a floor of yellowish sandy clay.

Burial 7: The second secondary burial (skeleton No. 4) had only the skull and long bones deposited in a cluster, meaning that it was disarticulated burial. The skull was placed in an east-west orientation. This burial was found in the grave at the depth of 1.60 meters.

Megalithic Period:

Burial 8: The adult male (skeleton No. 1) was in a primary articulated position in a west-east orientation. It was in a reclining position, resting on its back, almost in a sitting-at-ease posture with its head tilted towards the right shoulder. This slanted skeleton had its head at a high level (1.67 meters deep) and feet at a lower level (2.41 meters deep from the top). The right leg was bent a little and brought below the stretched-out left leg at an angle. Near the right foot the pit had a cluster of big stones on which the left foot was placed. (Burial 1 was placed near its feet) (Pl. XII). This pit was dug irregularly with sides

Kashmir Treasure Collection.Digitization by eGangotri

slanting and tapering towards the top. Its sides were lined with stone pieces. Five miniature pots in red ware were placed along the skeleton, three on the right and two to the left of left leg as grave goods.

Burial 9: An adult (skeleton no. 3) was placed on its right side in a flexed, crouching primary articulation. Its orientation was north-west to south-west. The grave pit, oval in shape and plastered internally with lime, was 1.77 meters deep. The skull of a dog was buried deep in the same grave pit.

Burial 10: The third burial of this period (skeleton no. 6) has been described as an 'accidental burial' by Sharma as the skull was severed from the torso and put in the normal occipital position towards the leg region, in an undisturbed pit. Therefore, it is partially articulated in a north-south orientation. Fragmentary bones of goat were also found in this grave pit at various levels.

The skeleton material in many instances was in a very poor state of preservation, extremely fragmentary with the bones in most cases badly broken. This was largely due to the heavy stone coverings of the graves.[98] However, anthropological studies have shown that of the ten individuals five were male, three female, one a juvenile and one was a child. The sex of the child and the young person was not determined for they have had not developed the characteristics used for differentiating males from females. The following list gives the sex of the individuals as per their Burial numbers:[99]

Male	*Female*
Burial 4	Burial 2
Burial 5	Burial 3
Burial 6	Burial 9
Burial 8	
Burial 10	

The assessment of the age of these skeletons was carried out on the basis of their age-grouping in a five year time bracket as follows:

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[98] A. Basu and A. Pal, *Human Remains from Burzahom*, p. 5

[99] *Human Remains from Burzahom*, p. 8

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1-5 years	11-15 years	26-30 years	31-35 years	46-50 years	51-55 years
Burial 1	Burial 7	Burial 3	Burial 2	Burial 8	Burial 5
		Burial 4	Burial 9		Burial 6
					Burial 10

The height of all the male members except Burial 6 is almost the same. The estimated statures of the male members bearing Burial nos. 4, 5, 8 and 10 are respectively 177.1 cms, 178.5 cms, 176.4 cms and 173.4 cms; and all those skeletons are regarded as falling within the category of tall. Similarly females also have uniformity of stature; the estimated values of the two females (Burial 2 and 3) are 159.1 cms and 163.8 cms.[100] The values of arms and legs indicate that Burzahom people possessed relatively long legs in relation to arms.

Basu and Pal determined the physical affinities of the Burzahom human remains with the available skeletal remains of a few Neolithic sites of South India as well as with the skeletal finds from the mature Harappan culture at cemetery R 37 Harappa.[101] As their measurements have shown that with the exception of one skull (Burial 10) all their metric features are precisely similar and can therefore, be considered as predominant and basic human element at Burzahom. All these skulls are markedly dolichocranic (dolichocrany is expressed by high values of head and low values of head breadth or in common language these are long headed) and their measurements and indices showed that these heads are closer to Harappan skulls from R 37 cemetery than any of Neolithic skulls from the South Indian sites of Tekkalakota, Nagarjuna Konda and Piklihal.

The female skulls differ from the male skulls in the usual pattern of sexual dimorphism but the proportions are mostly similar. The major features of these long-headed individuals are a long and narrow head, protruding occipit, somewhat low receding forehead, and medium to prominent super-orbital ridges, and prominent glabella with distinct post-glabellar salcus, high vertical portion height and a sturdy build with tall to medium stature. On such comparisons these

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100 *Human Remains from Burzahom*, p. 72.
101 *Human Remains from Burzahom*, pp. 73-80.

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Burzahom people resemble more closely the Harappa R 37 series than any of the Neolithic people of India.

The estimated mean stature of the Burzahom male series (169. 57 cms) falls within the range of the average values of stature observed in the living population of Punjab. Similarly the occurrence of the Charles facet in two femur bones of Burzahom is found in high frequency in Punjabi skeletons. The presence of the squatting facet on the tibia bones of Burzahom skeletons has been also found in Nal, Kish 'A', Anan and Hissar III materials of Western/ Central Asian people. All this points towards the fact that all these people belonged to one racial group, which as the present Punjabi population indicates, was the Caucasoid. As the physical features of these long-headed people of Burzahom shows no appreciable differences from that of Harappan R 37 people, Basu and Pal, therefore, are inclined to assert that their measurements and indices point towards genetic affinity between Harappan and Burzahom people and they even suggest ethnic continuity in spite of cultural differences.

Animal burials:

The evidence regarding animal burials comes from the Neolithic period II and the Megalithic period at Burzahom[102], like that of human burials. Those excavated from the period II were both of primary and secondary burials. Like humans, the animals were buried in dug up graves, oval in shape, narrow at the top and wider towards the bottom. Two examples were unearthed, in one case; the grave pit was irregular in shape. One of the examples was of a dog, buried in a flexed position, in a north-south orientation with the skull towards the north and the caudal region towards the south (Pl XIV). The second one was a fractional burial. The large egg-shaped grave pit, cut in the floor of a house, contained fragmentary bones of five wild dogs and two antlers of barasingha (*Cervus duvaceli*). The dogs were represented by five

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[102] A. K. Sharma, 'Animal Burials from Burzahom – A Neolithic settlement in Kashmir', *Journal of Oriental Institute of Baroda*, No. 1 and 2, 1968, pp. 40-44; *IAR*, 1962-63 gives their number as three of the Neolithic period II and two of the Megalithic period. Sharma, however, provides information for more than five animal burials; and accordingly his details form the basic material for our text.

Kashmir Treasure Collection.Digitization by eGangotri

intact skulls to which were attached portions of vertebral columns. Other fragmentary bones were mostly ribs, limb bones and fragments of pelvis (the filling of the grave was without any ashy material). All the loose bones bore fracture marks and were disposed without any order (Pl. XV). On the other hand, in a wide and deep pit with a charred lining was found a large number of loose bones, particularly of deer.

In the Megalithic period, both complete inhumation and fractional form of animal burial have been found. The primary burials were of two types, single flexed and double flexed. Two examples of single flexed burials were excavated. One was of a dog and other was of a wolf, and both graves were without grave goods. In the case of the wolf bones, though in articulated condition, they were completely charred and the grave pit was filled with a large quantity of ash, meaning that the animal was burnt *in situ* and later on the grave was filled up. It was the only one of this type found. Double flexed burials were mostly of dogs and in two cases of wolves. The dead animal was buried in a flexed position either on its right or left side in a north-south orientation. Only in one case was the skeleton of a dog found to be lying in a supine position, resting on its back with the legs pointing upwards. (The grave in this double burial contained two animals, mostly two animals of same type and in several cases these were dogs.) There was one exception in which one wolf was buried along with a dog. The two animals in such a double burial were, however, placed at two different levels, meaning that same grave was used on two different occasions for two different animals. The incidence of animal burial during this time was larger than that the preceding period indicating that the practice had become fairly common.

In addition to these types, there were also fractional burial types during the Megalithic period. In a pit were buried bones of various animals at two different levels. The disarticulated bones of a Himalayan ibex (*Capra falconera*) were buried (Pl. XIV) at an upper level, nearly 1.90 meters below the surface level, whereas at a lower level, nearly 2.20 meters below the ground level, were buried fragmentary bones of dogs, sheep, goats and antlers in a group without any articulation.

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Besides these types of animal burial, some animal bones were found in the graves of humans. These were of dog, sheep, goat and stag. These were always disarticulated and were deposited along with the human body in the same grave pit either at the level where the human body was placed or at a higher level. Some of these may have thus formed part of food-offerings to the dead person. It has even been suggested by Sharma, that pet or other animals were sacrificed to honour the dead person and some bones of such animals picked up, probably after making a feast of the flesh of the sacrificed animals[103] (See infra Chapter VII for further discussion).

He has further added that fractional burial of dogs during the period II may have also belonged to this category of sacrificial animal. Judging in particular from the fracture marks of their bones, he contends that the dogs were sacrificed, stripped of their flesh, and then ceremonially buried. The Allchins report that the dog was apparently almost a cult animal in the Shilka cave culture of the upper Amur; and dogs were until recently sacrificed and buried with their owners among such people as the Gilyaks, Ulchis and Goldis of this region.[104] But Gupta adds that the dog was hardly considered pious enough to be sacrificed.[105] Gorden Childe on the other hand records that dogs were found buried with their masters in Egypt in the Amartion or Nagada I graves as well as in the Haliopolic cemetery.[106] The incidence of dog burial with humans at Burzahom is low, precisely one dog head was found with Burial 9 while in another instance dog bones were found at a higher level in a grave pit of a human burial. The incidence of dog burials without humans as found at Burzahom has also been found in the Neolithic culture of North China, particularly in the Ang-Ang Hsi culture of Manchuria.[107] On the other hand the pit, which has a charred lining and contains a large number of animal bones, may have been

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[103] *Journal of Oriental Institute of Baroda*, No. 1 and 2

[104] Bridget and Raymond Allchin, *The Rise of Civilization in India and Pakistan*, New Delhi, 1983, p 116.

[105] S. P. Gupta, *Disposal of the Dead and Physical Types in Ancient India*, Delhi, 1972, p. 81.

[106] G. Childe, *New Light on the Most Ancient East*, London, 1958, p. 54.

[107] Bridget and Raymond Allchin, *The Rise of Civilization*; p. 116.

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used as a communal hearth with or without any religious significance, whereas the practice of animal burial may indicate an animal cult akin to totemism (see chapter VII for further discussion).

v) **Neolithic implements:**

During the course of excavations at Burzahom and Gofkral a variety of handmade pots in grey, dull red, gritty red and burnished wares in a variety of shapes were found. (Pl. XVI). in addition a large number of implements in bone and stone were found. The stone and bone tools provide substantial information about various activities of mankind in Kashmir (for details see chapter V). Generally speaking some of these tools were made for fishing and hunting purposes, while others like knives and scrapers were used to turn the killed animals into palatable food. There were also digging tools which might have been used for various digging operations including agricultural activity. The agricultural products seem to have been ground with milling tools before turning them into food. Carpentry and weaving were rendered possible with the use of various other types of tools, likewise there were tools fashioned in copper which, however, were used at later stages. They also had ornaments made of semi-precious stone beads, paste, steatite, terracotta and bone.

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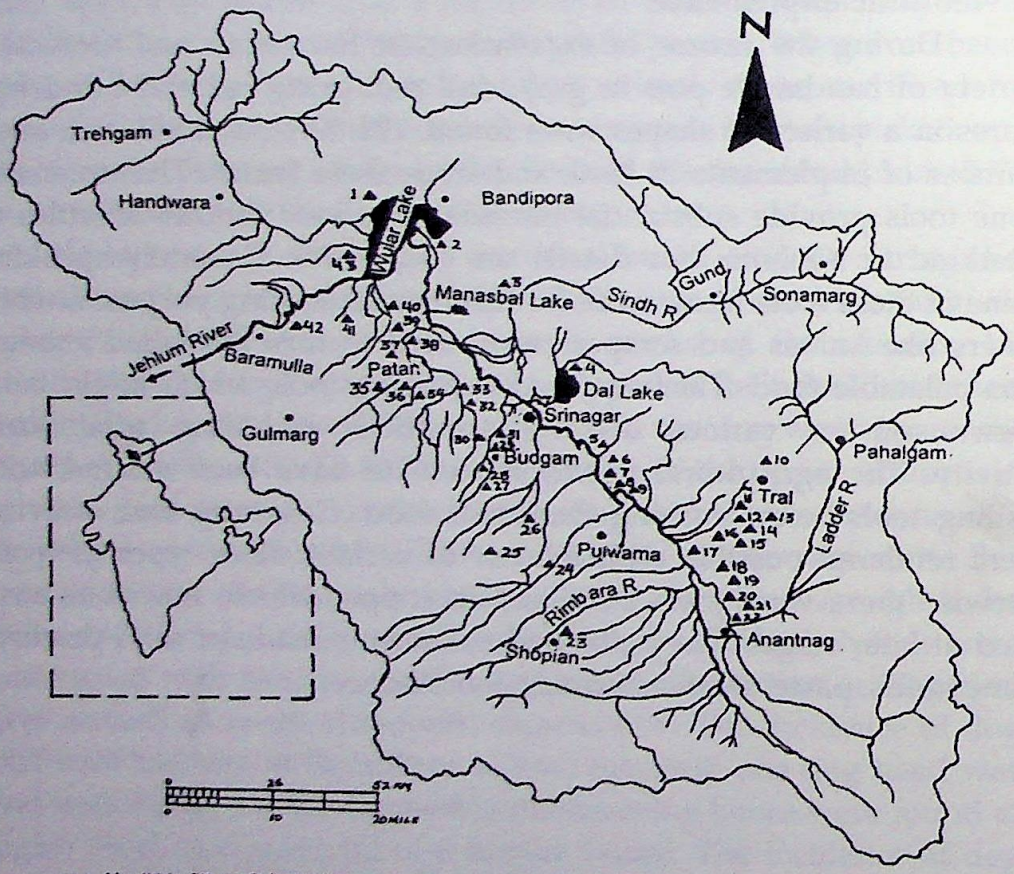
Map showing Neolithic Sites of Kashmir



▲ Neolithic Sites of Kashmir

1. Turkepora
2. Gurhama Sangari
3. Nunar
4. Burzahom
5. Sempur
6. Pampur
7. Shahpend
8. Olichibagh
9. Sombur
10. Narastan
11. Haripariqoam
12. Bagegund
13. Gofkral
14. Pinglish
15. Haribous
16. Dadsar
17. Borus
18. Jayadevi Udar
19. Thajwar
20. Kanyalwan
21. Wazatal
22. Brah
23. Balapur
24. Romu
25. Nilnag
26. Habashah Sahib
27. Khan Sahib
28. Dur
29. Budgam
30. Kaneer
31. Damudar Udar
32. Koshans
33. Hayatpur
34. Aripanthan
35. Kuldur
36. Tapribal
37. Gopasudar
38. Wanigoam
39. Kiri Chak
40. Bata Chak
41. Raiteng
42. Kaneshpuer
43. Bomai

• Modern Towns

~~~ River/Stream
~~~

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Chapter IV

ARTS AND CRAFTS

The terms arts and crafts have different connotations. The arts specify creations made with an aesthetic purpose, whereas crafts are generally devoid of the element of aesthetics, and utility is the basic principle. For the Palaeolithic man fabrication of stone tools from boulders and cobbles seems to have lacked any aesthetic consideration. On the contrary these skilful objects were plainly designed for the very survival of man. Strictly speaking, the earliest and naturalistic art objects were produced during the Upper Palaeolithic period in many parts of the world. This artistic activity of man was manifest in two principal forms: (i) engraved and sculptured objects and (ii) awe-inspiring decoration on cave walls[1] However, there is a complete break between the Palaeolithic and the Neolithic traditions as far as artistic creation is concerned. There may have been many reasons for the

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[1] Such art forms like engravings and sculptures belonging to the Upper Palaeolithic period are particularly available in Europe, F. Bordes, *The Old Stone Age*, London, 1968, while as magnificent prehistoric wall painting were drawn from the Aurignacian to the Magdalenian time in France and Spain, *Ibid*. In India the cave art of comparable date is visible in Bimbethka, UP, D.P. Agrawal, *Archaeology in India*, London, 1992. There are some rock engravings in Kashmir at Gilgit, of which many have tentatively been dated to the Upper Palaeolithic and to the Mesolithic periods, A.H. Dani, *Chilas: The City of Nanga Parvat*, Islamabad, 1983, as well as at Ladakh which, however, do not provide any precise date, A.H. Franke, *Antiquities of Indian Tibet*, Calcutta, 1926; but many of these are thought to be of the Palaeolithic period, J.L Bhan, 'Rock art as a clue to the cultural history of Ladakh', *Journal of Central Asian Studies*, Vol. VI, No. 1, Srinagar, 1995, pp. 17-24. Such rock-art forms are, however, regarded by some art-historians, like Mulk Raj Anand, as `heightened passion of man in search of food,' *Marg*, Vol. XXVII, No. 4, Bombay, 1975, p.5.

Kashmir Treasure Collection.Digitization by eGangotri

decline of naturalistic art, but the primary one seems to have been economical that separates the two prehistoric stages into two periods.[2]

Early Art of Kashmir:

In the valley of Kashmir no such naturalistic art manifestations of the Palaeolithic period survive, save one that was found recently near Bomai in Sopore, north Kashmir[3]. It is an engraving on a flat surface of a vertical cliff of a hill, having dimensions 1.6 meters in length and 1.3 meters in breadth with a portion on the left and at the top partially damaged. The rock engraving is the only of its kind found in an *in situ* condition in Kashmir depicting prehistoric trait of hunting by masked men. For making the engraving pecking technique has been employed (Pl. II) and depicts four large circles, each having more circles within and bearing radiating lines in two cases. Three of these form a linear straight line while the fourth is placed at the extreme left to symbolize the sun (Fig 34).

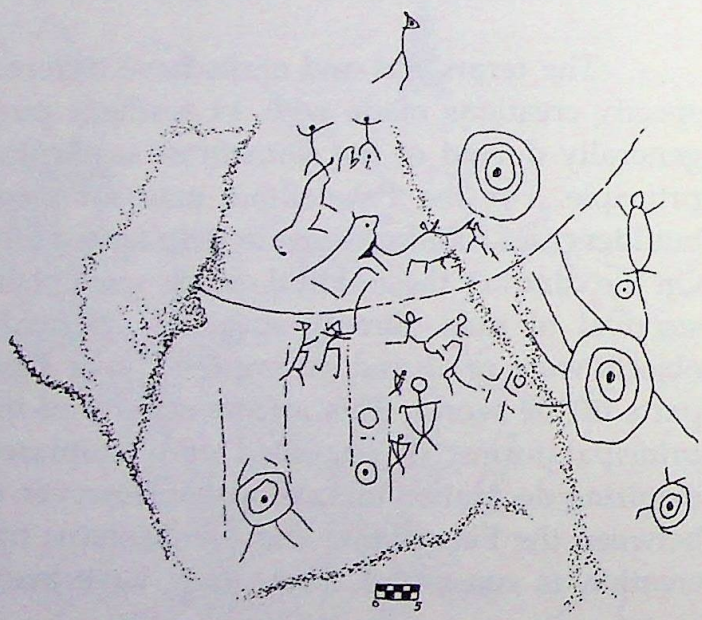

Fig. 34 Rock engraving, Bomai, Sopore

Besides there are many other figures including quadripedal animals, abstract lines and loops and two to three possible hunting scenes carried out by men standing one after the other. Of one group of

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2 Jacquetta Hawkes, *History of Mankind*, (Prehistory and beginning of civilization), Vol. I, London,1963, p. 330.

3 Aijaz A Bandey, "Preliminary Report: Archaeological explorations in Bomai village, Sopore," *Central Asian Digest*, Vol XXIII, 2003, pp10-12.

Kashmir Treasure Collection.Digitization by eGangotri

four hunters in a row, the two rear figures have animal masks on their heads and appear to be dancing while the front figures are standing in front of a hunted animal lying on the ground. The whole scene suggests some kind of relationship between the sun symbols and hunting scenes[4]. Even otherwise one finds the Palaeolithic trait of hunting by the people in bands for their sustenance carved in the fashion that was prevalent during the Upper Palaeolithic times else where. Like all such rock carvings the Bomai one has the human figures as well as animal figures executed as line drawings without delineation of the body contours in particular that of the humans. Having remained exposed to all sorts of weather conditions for thousands of years the carving is in an excellent condition still to present the sketchy scene of the Palaeolithic era. The find of an Upper Palaeolithic hand axe in the vicinity along with the presence of many rock shelters, mostly shallow, would suggest that they together were in use during the Upper Palaeolithic times.

This solitary example of the Palaeolithic rock art carving find in the Valley proper would suggest exploring intensively for their documentation more so because many others have been found on the outer hills of Kashmir[5]. The two similar looking finds, on the stone slabs, from the Neolithic levels at Burzahom lends further support to this view (Pl. XVII).

Both these engraved slabs were found from stratified layers of the Neolithic period II[6]. Both had fallen in disuse as pieces of art. A

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4 A preliminary study of the scene suggest some kind of astronomical depiction or metaphor impact recording , *Astronomical interpretation of the Palaeolithic Rock Carving found in Sopore, Kashmir,* M N Vahia, Aijaz A Banday, *et al,* to appear in Purattatva.

5 Both Gilgit and Ladakh where from the rock art forms are known, supra note 1, are located on the outer hills of Kashmir valley in its north west and north as through both these regions ancient routes connected Kashmir with outside world authentically since the historic times, S.M. Ahmed, 'Central Asia and Kashmir', *Central Asia and Western Himalaya: A Forgotten Link,* ed G. M. Buth, Jodhpur, 1986, pp.1-8.

6 *Indian Archaeology A Review (IAR),* 1964–65 and *IAR,* 1965-66; B. M. Pande, 'Neolithic hunting scene on a stone slab from Burzahom, Kashmir', *Asian Perspective,* Vol. XIV, 1971, pp. 194–98; and B. M. Pande, 'Tectiform from

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study of the situation in which these were fitted in a structure leads one to infer that these slabs were used as building materials[7]. These slabs, therefore, seem to have lost the purpose for which they were made and as such may not necessarily have belonged to the period II. Since these slabs depict scenes related to hunting, it is quite possible that they might have belonged to the period when hunting on a large scale sustained the Neolithic economy. It is worth noting that the hunting of wild animals, like *cervus* as is represented on one of the slabs, was practiced largely during the early phase of Neolithic culture which was progressively overtaken by a higher percentage of domestication of livestock.[8] These slabs depicting the artistic creations of man seem to have been the off-shoot of influences generated by the example of human and animal engravings on rock surfaces surviving in and on the outer-hills of Kashmir at a time when the people at Burzahom were either yet to form the settlement or were in the process of making the village when hunting of animals was carried comparatively at a larger scale.

A study of the situation in which these were fitted in a structure leads one to infer that these slabs were used as building materials[9]. These slabs, therefore, seem to have lost the purpose for which they were made and as such may not necessarily have belonged to the period II. Since these slabs depict scenes related to hunting, it is quite possible that they might have belonged to an earlier period when

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Burzahom, district Srinagar, Kashmir', *Journal of India Anthropological Society,* Vol. 7, 1972, pp. 175 -77

7 Because these engravings were found in a structure of period II where their utility was mainly for building a structure and were in such a position that the engraved surfaces were facing inwards and in upside down position, they as such had lost the utility they were made for, B.M. Pande, *Ibid*

8 A collection of animal bones from Gofkral shows that stag-hunting decreased from the Aceramic to the advanced stages of the Neolithic period there, A.K Sharma 'Excavations at Gofkral 1981', *Puratattva,* No 11, 1982; see for details infra Chapter on Economy

9 Because these engravings were found in a structure of period II where their utility was mainly for building a structure and were in such a position that the engraved surfaces were facing inwards and in upside down position, they as such had lost the utility they were made for, B.M. Pande, *Ibid*

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hunting on a large scale sustained the economy. It is worth noting that the hunting of wild animals, like *cervus* as is represented on one of the slabs at Burzahom, was practised largely during the early phase of Neolithic culture which was progressively overtaken by a higher percentage of domestication of livestock.[10]

The central figure engraved on the slab [11] bearing a hunting scene[12] (Fig. 35) is of a stag[13] that has a striped or spotted body and multi-branched antlers. The depicted animal has a short tail and an exaggeratedly long male genital. The rear of the animal is being attacked by a spear-bearing human figure[14] that holds the weapon in the raised right hand while the other hand rests on the hip of the hunter. In front of the animal, there is an archer,[15] resting on his left bended knee holding a bow in the left hand; with the right hand is released an arrow which pierces the chest of the static animal. The scene further portrays a dog[16] accompanying the hunters, engraved on the top register of the slab. The animal has a lean body, a long curved tail and an erect genital. In addition there are two representations of the sun, one complete and the other incomplete,[17] formed of two concentric circles with radiating lines all around the outer ring.

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10 A collection of animal bones from Gofkral shows that stag-hunting decreased from the Aceramic to the advanced stages of the Neolithic period there, A.K Sharma 'Excavations at Gofkral 1981', *Puratattva*, No 11, 1982; see for details infra Chapter on Economy

11 The slab, measuring 70x 45 cms is flat on both sides, irregularly cut and smoother on the engraved face, B.M. Pande, *Asian Perspective*.

12 The hunting scene on the slab covers an area of 48 x 27 cms, *Asian Perspective*.

13 The stag measures 14 cms in length and 13 cms in height, *Asian Perspective*.

14 The human figure is 13 cms in height, *Asian Perspective*.

15 The archer is 12 cms in height, *Asian Perspective*.

16 The dog is 6 cms in length and height, *Asian Perspective*.

17 S.S. Saar is of the opinion that the incomplete representation of the sun is because of the fact that during the process of its engraving a part of the sun got chipped off and as such a fresh engraving of the complete sun was made, *Archaeology, Ancestors of Kashmir*, New Delhi, 1992, p.47; B.M. Pande, on the other hand, has said that the two representations of the sun were purposely made to demarcate the time span (from sunrise to sunset) that the people took for the hunt, *Asian Perspective*.

Kashmir Treasure Collection.Digitization by eGangotri

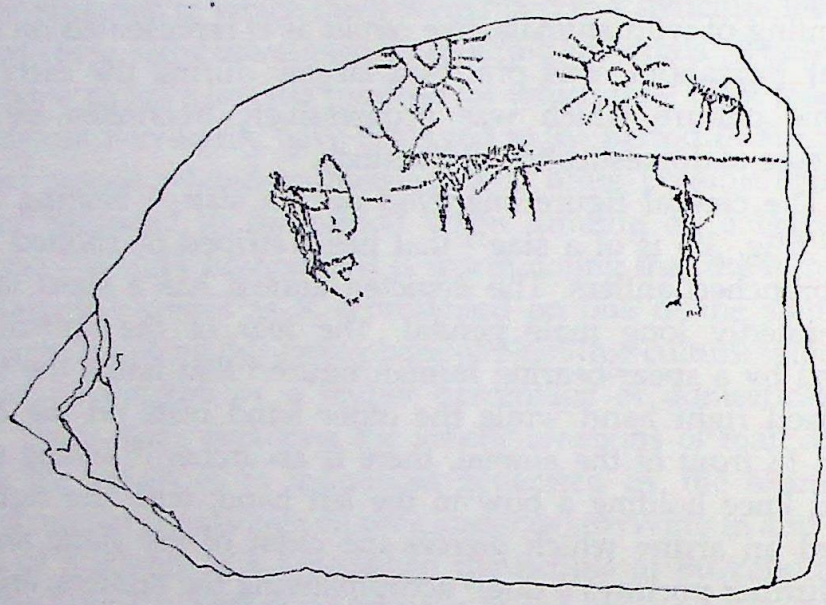

Fig. 35 Hunting of a stag at Burzahom

The subject matter embodied on the slab portrays primarily hunting since it was the earliest occupation of the Neolithic people, which besides farming also sustained their lives at the beginning of the culture, possibly at the time the scene was conceived and executed. In addition, it also elucidates the skill of hunting and weapons like the spear, bow and arrow employed together in a particular hunt. Even though the graphic scene of the slab reflects some of the body parts and organs in exaggerated size,[18] yet the figures are distinctly delineated and show the human figures in their full profile while the animals are in partial profile. Though the primitive nature of the engravings is well marked by the contours of the figures which are not rounded but angular, yet the vivid and well marked lines of the scene facilitate the identification of the engraved figures very clearly.

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[18] In comparison to other parts of the body the size of the genitals of the stag and the dog are very long. This is also the case with the archer whose trunk is unusually long and what has been called the genital of the archer (*Asian Perspective.*) is too long for the man.

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B. M. Pande has identified the human figures that of a male archer and a female spear-bearer.[19] He based his observation on the presence of male genital of an extra-ordinary size, hanging in between the legs of the archer. On the other hand, he identified the female figure on the basis of her akimbo pose – a characteristic of females to keep one hand on their hip with elbow pointing outwards, her dress comprising a skirt, and contour profile of mammary glands. He further explained that the hanging object in between the legs of this female figure is not the male member but a natural break in the slab.[20] Saar has identified this spear-bearer with a male figure with exposed male genitalia.[21] Even though the nature of the rock surface as well as the pecking technique employed in the execution of the portrayal of the engraved figures restrict the scope of vividly describing the tiny body contours, yet such hanging objects in between the legs of human figures have been interpreted elsewhere as tails of animal skins used as dress[22] which may be the case here as well. Accordingly there is no difficulty in identifying the figures as male and female who have used the animal skin to dress up and it is the tail of their skin that is hanging in between their legs and not the genitals.

Be it as it may be, the delineations at the primitive stage of artistic creation are more or less realistic. These are significant enough for they not only define human association and relationship but also

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19 *Asian Perspective.*

20 This is not shown in the drawing published by B.M. Pande, *Asian Perspective* ; but is shown in *IAR*, 1965-66, Pl. X , as well as in the drawing made by S.S. Saar, *Archaeology*, IL – 43, p. 47

21 S.S. Saar, *Archaeology*. He also does not mention that the stone slab has any break in between the legs of the spear-bearer, neither in his drawing the mammary gland is as pronounced as that of a female shown by B.M. Pande. This, however, is true that the gland is pronounced as is found from the Pl. in *IAR*, 1965-66 but not as much as has been depicted in the drawing by Pande.

22 A.H. Dani, *Chilas*. He no where mentions such hanging objects as male genitals of human figures. Instead they are interpreted as tails of animal skins used as human dress during the pre-Neolithic times in the cold region of Nanga Parvat. On this analogy, the female spear-bearer is wearing one such animal skin and the hanging object in between the legs is the tail of the animal. This may, as such, be true in case of the archer too.

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the conceptual thinking underlying the projection of the scene. It has therefore been said that the two representations of the sun may indicate that hunting of large animals was carried from the sun rise to the sun set or, else may point to a custom, a primitive ritual or a religious belief based on the sun symbols[23] prevalent at the time. What however is important is that by the time the engraved slab was used in the construction at Burzahom, during the middle stages of the farming economy, not only hunting but the conceptual projection of the rituals, at least in the displayed manner, had lost their meaning.

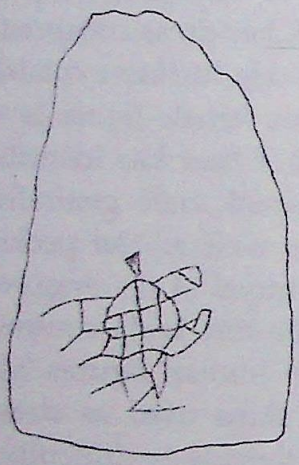

Fig. 36 Tectiform engraving, Burzahom

The flat surface of the second stone slab[24] has an engraving of an abstract design of a hut (Fig. 36). The hemispherical thatched roof of it is surmounted by prominent broom–shaped spire. Inside the hut, on the drum portion of the roof is said to be present the hind portion of an animal with a tail.[25] This abstract graphic representation of hut with the trapped animal is called a tectiform – connected with the magico–religious rites of the people.[26]

Crafts of Neolithic Kashmir:

Pottery:

Pottery has a claim to attention among the artistic creations of the people. It is profusely available through out the Valley at the Neolithic sites and most of these have been located on the basis of the

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[23] For details see infra Chapter on Society.

[24] The stone slab is broken along the edges and appears roughly triangular or conical in shape. B. M. Pande, *Journal of Indian Anthropological Society.*

[25] B.M. Pande, *Journal of Indian Anthropological Society,* the identifications and explanations thereof are after him.

[26] *Journal of Indian Anthropological Society.* For religious beliefs see infra Chapter on Society.

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presence of it. The extensive and easy availability of clay used for making various types of pottery, the relative difficulty with which large quantities of pottery can be transported to localities far from their place of origin, the necessity of replacing broken pots with new ones, and the non-perishable nature of a pottery vessel or its fragment is often sufficient to indicate the age or the cultural stage of a society. Because of these characteristics pottery specimens are sometimes the only evidence of a bygone society at a site. Since pottery objects represent man's response to the utilitarian and even aesthetic needs of a particular milieu at a given time, pottery vessels are generally accepted as one of the best denominators of time. They also convey information about the technological advancements attained by the people who made and used the vessels. They also help in establishing a cultural sequence of a site and as such conclusions are sometimes drawn exclusively on such ceramic evidence. Accordingly pottery has enjoyed a singularly important position in archaeological studies. These studies are now supplemented by the recent application of scientific disciplines to come to a more reasonable and logical conclusions.

A large number of pottery vessels in different types of wares were made in Kashmir during the period (Pl. X, XI, XVI, XVIII and XIX). The virtue of this pottery lies in the distinct nature of the wares, the fine mastery of form and style. These are differentiated on the basis of their colour and fabric but it is also true that scholars have differentiated these variedly and they have provided conflicting chronological sequence for their evolvement. The same is the case with regard to the description of the type of technology in use for producing the pottery. We have, however, recognised the following four principal types of pottery at various sites across the Valley, which is all hand-made:

Coarse thick grey ware
Fine grey ware
Black burnished ware
Gritty red ware

In addition to these many other pottery types are reported classified on the basis of their colour, texture and the technology used for their fabrication. In order to ascertain the facts about the types of

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pottery fabricated we are asking the question how the pottery was made, and the answer to this question will not only reveal the technical skill of the people but also lead us to know how different textures and colours were attained. At the same time it is also interesting to see at what point in time each type of pottery was made during the existence of the culture to understand the facets of evolution that provides a definite chronological framework for defining the cultural horizons of the age.

Technology:

Not to expect the prehistoric man to leave any written record of his activities it is not but easy to reconstruct the progress of these activities and skill in a scientific way. It is but worthwhile to piece together the relics of his culture and to investigate and build, up to reasonable limits, the history of this technology to answer many of the questions that have been raised.

Sir Lindsay Scott while writing on the question of origin of hand-made pottery-making says that there is no archaeological evidence for the suggestion that basket making was an antecedent of ceramic making[27]. This may be true even in respect of Kashmir but basket weaving or mat weaving had, if it did not proceed, emerged along with this craft if the pottery specimens carrying the weaving impressions of mats are the right indicators. Such impressions help to understand the technique in use for the making of this pottery.

Pottery is sometimes a substitute material for objects like baskets but it has itself no characteristic form. The shapes which we think of as characteristic of pottery are of the product, not of the clay as a material, but of a particular method of working clay. To give a shape to a pot three important steps are required:

- Clay is to be moulded into a pot;
- The clay pot is dried to retain the moulded shape; and

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[27] Sir Lindsay Scott, "Pottery", *A History of Technology*, Eds Charles Singer, E. J. Holmyard and A. R. Hall, Vol. I, Oxford, !955, p376

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- The dried clay pot is baked to convert the clay into pottery.

All the three steps required for pottery making were taken in the period to produce watertight, fully baked and complete vessels in Kashmir.

The raw material for pot making was clay, a product of decomposition of rocks, containing minerals of hydrated aluminium silicates with admixture of alkalis, iron oxide, etc. Such primary clays are easily and ubiquitously available in nature. They are in the form of flat, platy and thin crystals, having the formula $Al_2O_3.2SiO_3.2H_2O$, drawn from feldspars like calcite feldspars, potassium feldspars, etc. To make clay for pot building water is added to it to react in the following way:

$$CaOAl_2O_32SiO_2+3H_2O \rightarrow Ca\ (OH)_2 + Al_2O_3.2SiO_23H_2O.$$

The water molecule attached to the clay crystal is water of crystallization. It becomes plastic when mixed with an appropriate quantity of water so that an indefinite number of water molecules get attached to the clay crystal to remain outside the crystal lattice. These physically attached water molecules make it plastic. Such plastic clay is moulded into a great variety of shapes, which is retained in the subsequent air or sun drying. When such drying reaches a stage where the clay retains 8-15% by weight the physically attached water molecules it becomes 'leather hard'. Further sun or air drying reduces the physically attached water molecule to 3% by weight to make the clay pot 'white hard'. Such a clay object is afterwards baked to make the pottery.

All the pottery vessels that were made during the period in Kashmir were made of loess. It is secondary clay which was easily available to these potters in and around their habitations[28]. The loess clays, because of their shape and minute size of clay crystals, are in the

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28 Loess is the top most layer on the karewas on which the Neolithic settlements are found. The soil was carried by wind during the Pleistocene ice age and thus acquired additional impurities in the process. The soil is still used by the present day potters for their pot making, particularly its weathered layers.

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form of very small flat plates. They become exceptionally plastic when mixed with water. During the sun drying, pots built of loess, contract in the process of evaporation which is further enhanced during the firing stage (when the chemically combined water is driven out). To prevent cracking and warping of these pots these potters added some tempering material to counter stickiness and to obtain greater porosity. Radiographical studies carried on some of their potteries[29] have shown that the potters had used coarse sand fillers in the thick coarse grey ware pots. The fine grey ware has crushed rock material like large sized angular grains of milky quartz as fillers. The burnished ware has few types of filler while the gritty red ware contains many types of coarse sand fillers.

After the tempering material was added to the clay it was kneaded like baker's dough. Thereafter the actual skilful job of the potter was to begin to build the ambitious vessel. Studies carried under microscope and through radiography were able to demonstrate that the body of these vessels had mostly gaps and horizontal grooves of asymmetrical sizes and shapes, without being uniform and appearing at intervals[30]. Where groove traces are feeble clay appears to have been dragged downwards to overlap the lower band of the clay, sometimes overriding it. All this was the offshoot of the manufacturing techniques employed for the building up of these hand-made pots in Kashmir. Accordingly, the studies are suggestive that for pot making either strip or coil technique[31] was employed wherein a part of kneaded clay was worked into a round base and placed on a round pottery shred or reed mat or basket,[32] as on the turning wheel which is used today for the

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[29] R K Pant, "Kashmir Neolithic-A reappraisal", paper presented at XII Annual Congress of Indian Archaeological Society (*IAS*) and VIII Conference of Indian Society for Prehistoric and Quaternary Studies (*ISPQS*), jointly held at Allahabad, Dec 1981.

[30] R.K. Pant, *IAS and ISPQS, 1981.*

[31] R.K. Pant, *IAS and ISPQS, 1981.*

[32] Mat or cord impression on the base of pottery is suggestive of it, or alternatively a reed basket may have served the purpose particularly when the shape was to be maintained with fingers of the potter on the inner side during the thinning of clay walls. In that case the basket in a suitable shape and size may have served well particularly for a pot like a bowl or dish.

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production of pottery and which was not used during the early period of pot-making in Kashmir. Thereafter either coil or strip (ring) technique was used for the preparation of the ambitious vessel.

In the first technique thin and long ropes of clay were rolled, in the form of a sausage, which were used spirally one above the other, wherein one coil was mounted along the base, and at each turn the coil spiraled one above the other. The latest spiral of the coil was pinched, pressed and smeared on the one below to put the pot roughly together. In the strip technique the procedure of making a pot was similar except that separate strips in the form of rings were built one above the other. The shape of the pot was further perfected by thinning the walls after manually pressing and smearing the coils against each other[33]. Possibly with the assistance of a helper the underneath reed mat or basket was turned round and round so that the potter working with one hand inside the pot and the other out side was able to flatten and pat the walls both internally and externally to unite the clay strips into one piece of the desired pot.[34] It is because of employment of such techniques that asymmetrical grooves and gaps were left in the matrix of the pots. It was found that the thick coarse grey ware and the gritty red ware pots were made by strip technique while the fine grey ware pots were made in coil technique and the black burnished pots were made both in coil and in strip technique.[35]

The techniques used left the surface of the pot more or less rough, for smoother surfaces the leather hard pot was therefore subjected to scraping. Many of these pots reveal that brushing with a reed brush was employed to remove the excess of clay and to make the surfaces of the pots even. Sometimes such markings were left as such as on the fine grey ware. In many cases certain kinds of designs, like notching, twisting, pinching, etc were made to decorate the exposed surfaces either on the neck region or near the rims. The pottery found at Bomai reveals that the fine grey ware pots have also varied scraping

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33 Sir Lindsay Scott, *A History of Technology*, p 384.

34 J. Hawkes, *History of Mankind, p. 303.*

35 R.K. Pant, *IAS & ISPQS*, 1980. The gritty red show irregular fracturing and cores appear often dark in colour.

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marks as compared to the pieces from other sites. They also carry a variety of designs which include raised circular button designs, long looped curved designs, raised bunding designs, nail-like combed designs, etc. Their rims likewise show variations which are mostly thick carrying roughly denticulated wave designs, alternate elevation-depression designs, etc. Both black and grey burnished pots generally have incised oblong or triangular designs. Their burnishing marks are highly visible.

Many other pots were characterized by graffiti marks[36]. These marking are in the form of tiny lines scratched to form certain marks on the body of pottery. These marks are believed to have been incised mostly in the post-firing stage but sometimes in the pre-firing stage.[37] The glossy surface of the burnished pots was achieved by the application of mechanical friction to the leather hard surfaces of the clay pot, with the aid of a smooth pebble or other hard implement, to close the surface pores of the clay pot. These pots are therefore more water tight, their fabric less porous and hence have agreeable glossy surface. Such pots after firing are almost lustrous or polished in appearance and their exterior or exposed surfaces are very smooth.

At the later stages of this culture hand-made pots were supplemented by wheel-turned ones. The potter's wheel introduced the entirely novel principle of "throwing pottery", i. e. of shaping the plastic clay by spinning, the energy being derived from the rapidly rotating wheel-head and not from the potter's fingers[38]. With the introduction of a spun-wheel, pots became thinner in fabric and had greater finish and smoothness.

In either case the built clay pot was subjected to sun drying to retain the desired shape and to reduce the water content in the leather

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36 Graffiti marks were reported from Gofkral, (A K Sharma, *Puratattva*, 1982) and Burzahom, (S.S. Saar, *Archaeology*, 1992). These have also been found at Bomai, Sopore, from the pottery collections from a Neolithic mound where black burnished ware carry such marks, Aijaz A. Bandey, *Circle of Inner Asian Art*, no 18, London, 2003.

37 B. B. Lal, " From the Megalithic to the Harappan : tracing back to the graffiti on the pottery", *Ancient India*, No 16, 1960, pp 4-24

38 Sir Lindsay Scott, *A History of Technology*, p 381

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hard clay object to 8-15%. The clay pots thus made were subjected to firing to change their status into terracotta. The firing of clay causes chemical changes which are of extreme complexity and depend on the composition of clay, the temperature of firing, the rate at which that temperature is achieved, and the gases in contact with the pot at all stages in the firing.[39]

Firing the clay pots at 110^0C, they lose all the physically attached water molecules as vapour. A temperature around 350^0 C makes outer surface of the clay pot hardened but leaves the core soft, called ill-fired or inadequately baked object. Between 350^0-450^0 C a change takes place in the clay, the substance decomposes with the loss of chemically attached water of crystallization and aluminium silicate changes into alumina and silica. It becomes incapable of further chemical combination with water and transforms into partially hardened material, like the clay plaster in a hearth lit with fire. At 450^0-700^0 C the clay particles are still infused but useful pots result.

Firing of pots is affected in kilns or in open fires and with all sorts of fuel. In the open fire clay pots are stocked along with the fuel and covered with a covering of earth, etc. to allow an open or smoother fire. In such fires a temperature of about 800^0 C can be attained and lasts for as much as three days, though the heating of different pots is necessarily uneven and many are spoiled.[40] Kiln firing on the other hand allows of a higher temperature of 1000^0 C and beyond and also allows having better control of the temperature around the pots. At 1000^0 C the outer surface and core of pots become hard enough to make them completely baked objects. In such cases the shrinkage of clay occurs, owing to change in crystal structure, with increase in mechanical strength and decrease in porosity. When the temperature is allowed to rise further up to 1200^0 C alumina and silica recombines to form new aluminum silicate $2Al_2O_33SiO_2$ to make the body of the object fully vitrified, hard, dense and durable, and such pots are thus called fired clay or terracotta.

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39 Sir Lindsay Scott, *A History of Technology*, p 381

40 J. Hawkes, *History of Mankind, p. 304.*

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There is reason to believe that such a stage of firing was achieved at the given time as copper was melted to make certain types of implements that requires a high temperature of around 1140^0 C[41]. It is also certain that the Neolithic potters in Kashmir fired their pots in closed kilns. The kiln in use had an open mouth with inner and bottom walls plastered with mud.[42] Such kilns allow retention of a uniform high temperature during firing to produce high resistant pots. This vertical kiln which had a diameter as large as 1.70 metres would have allowed stock piling of large number of pots, thus cutting down the cost involved in firing. Essentially, the cylindrical part of this type of kiln encloses the hot gases from the hearth below, when the mouth is closed like a dome, to allow them to escape through an aperture like a chimney under controlled conditions.[43] Without having any clue as to how the dome on the mouth was built, in its simplest form it could have been merely a temporary structure consisting of shreds, stone flakes resting on the pots being fired and covered with earth, etc to be dismantled for emptying the kiln after firing the pots.

The kiln firing allowed the potters to make durable, water tight, hard pots that were available in shades of red, buff, grey and black. Firing had a great effect on the colour of these finished pots. The factors involved for the colour of pots are complex depending upon the constituents in the clay. For example, if the clay has organic matter in it, this tends to have a brown to black colour before firing, the core of the ware becomes grey or black as the surface of the pots gets fused before the carbon is fully iodized or because too little oxygen was available during the firing.[44] Nevertheless, the general rule is that if firing is carried to a high temperature with plentiful of oxygen supply, particularly when iron compounds like iron oxide are present in the clay, the clay pot will fire red. And in case there is deficiency of oxygen

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41 See the sequel for details of copper metallurgy.

42 One such kiln was found at Gofkral (period IB – the period when pottery was first made), A.K. Sharma, 'Excavations at Gofkral, *IAS* and *ISPQS Conference*, New Delhi, 25-27, Oct, 1982.

43 Sir Lindsay Scott, *History of Technology*, p 381.

44 Sir Lindsay Scott, *History of Technology*, p 381.

Kashmir Treasure Collection.Digitization by eGangotri

supply in the fire the colour will be grey or black.[45] As both these colours i.e. shade of red and black, are available in the archaeological remains of the time, it is safe to believe that both these firing techniques were known to these potters. There are certain pots which are of bi-colour wherein black colour is attained by placing part of the pot in ashes and leaving the rest of it exposed in the kiln to attain the red colour.

What we gather from the given account is that the society, even though primitive in outlook, had attained high technological results to produce pottery articles. The pottery vessels in different shades and types carry a variety of shapes. The adaptation of shapes to utility is best displayed where a community develops a variety of types, each designed to meet a separate need. But changing shapes and types is an element which depends on personal taste, fashion of the time and even on the development of the craft itself. The history of pottery evolution, however, cannot be explained on the basis of individual taste but in respect of their variety found at various levels of their culture to throw light how the development took place.

Chronology:

While excavating Burzahom, Khazanchi gave certain details about the shapes and evolution of the pottery collected there, which can be summarized in the following table[46]:

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45 J. Hawkes, *History of Mankind*, p. 304.

46 *IAR*, 1961-62

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Table 1

Period BC	Ware Type	Shape	Design / Impression
3000-2500	-Hand-made coarse grey ware -Hand made coarse dull red ware having shades of brown and buff	Bowl, vase, stem piece(of a dish on stand)	Mat impression on base
2500-1700	-Same as above -Hand made grey or black burnished ware	Dish, dish on stand, bowl, globular pot, funnel shaped vase, jar, high necked jar and basin	Lower part of neck of jar with incised oblique notches, basin with obliquely cut rim
1700-1000	-Predominantly wheel made red ware -Some ware & types of earlier period continued limitedly		

The given details are not exhaustive and therefore very little can be known from the above table, particularly as Kazanchi gives limited details about the shapes appearing in the different pottery types, as are given in the Fig 37, 38, 39 & 40. However, what we can gather from it is that in 3000 BC hand-made coarse grey ware was the first pottery type to appear along with coarse dull red ware; both having limited shapes which were of table ware. These types and shapes continued between 2500 -1700 BC when grey or black burnished ware was introduced, as storage as well as table types. At the final stage, between 1700 - 1000 BC wheel-made red ware got introduced. S. S. Saar and R. K. Pant are not in agreement with this evolutionary chronological development of the pottery, instead have provided separate reports of its development at this site. In the first instance they hold that the stratigraphical layers

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belonging to the period from 3000 to 2500 BC were devoid of pottery and hence the cultural stage was Aceramic in nature[47].

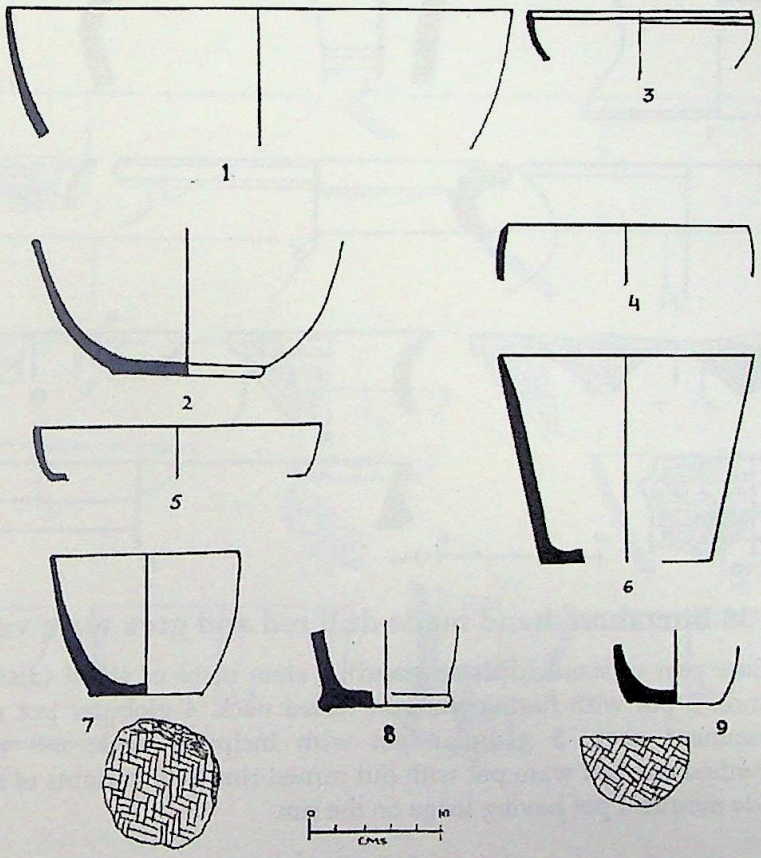

Fig. 37 Burzahom hand-made bowls and basins

1 Convex sided bowl, 2 convex sided bowl with pedestaled ring base,3 – 4 shallow basin, 5 shallow basin with straight base, 6 deep bowl with tapering straight sides and straight base, 7 deep convex sided bowl and base having mat impression, 8 bowl with straight sides and base having ledge, 9 bowl with straight base carrying mat impression.

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47 S.S.Saar, *Archaeology: The Ancestors of Kashmir*, New Delhi, 1992,p 17 and R.K.Pant, *IAS and ISQS*,1981

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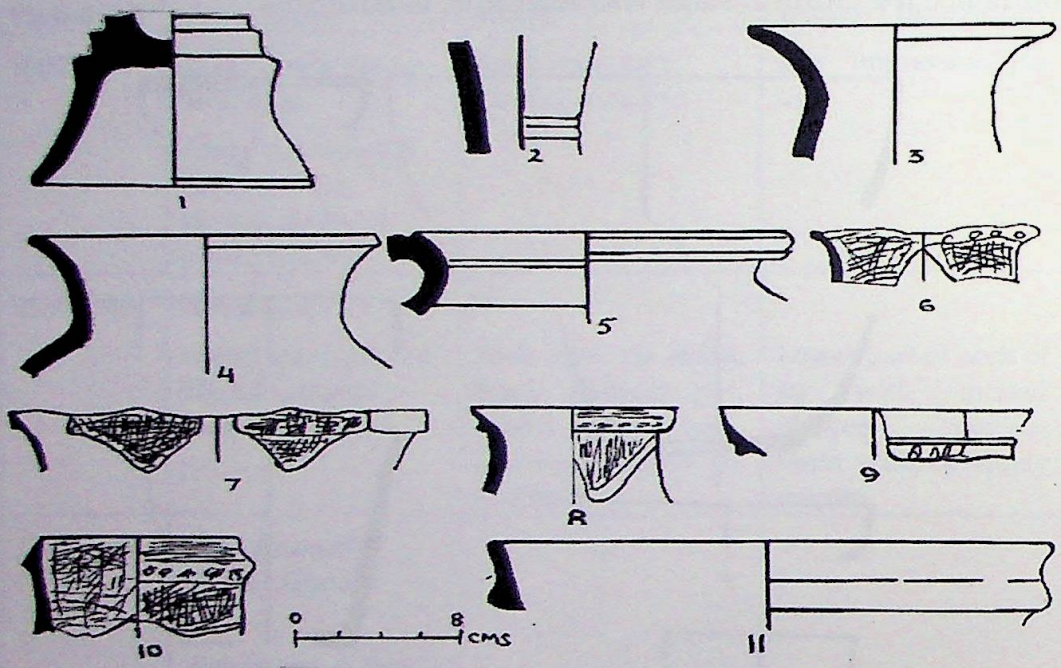

Fig. 38 Burzahom hand made dull red and grey ware vessels

1 Base part of stand (dish on stand), 2 stem piece of stand (dish on stand), 3 pot with flaring rim and raised neck, 4 globular pot with prominent neck, 5 globular pot with incipient neck, 6-8 wide mouthed combed ware pot with out turned rim, 9-10 variants of 8, 11 wide mouthed pot having ledge on the rim.

Saar clarifies that those pottery deposits which Khazanchi located from the circular shaped pits of this period actually did not belong to this cultural stage but to the subsequent period. He reports that in fact 96% of these pits were found to contain no pottery and since these pits were mostly located on the slopes of the archaeological mound the pottery remains, wherever found were washed away from the upper reaches of the site. The arguments regarding the aceramic character of the cultural stage are supported by the excavations carried out of various loess profiles within the Neolithic assemblages across the Valley, as at Kuladur, Khan Sahib, Pyath Pathur, Raiteng Nala, Huin,

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Malapur, Batachak, Nilanag, etc.[48] and also by the excavations conducted by Banerji and Sharma at Gofkral.[49]

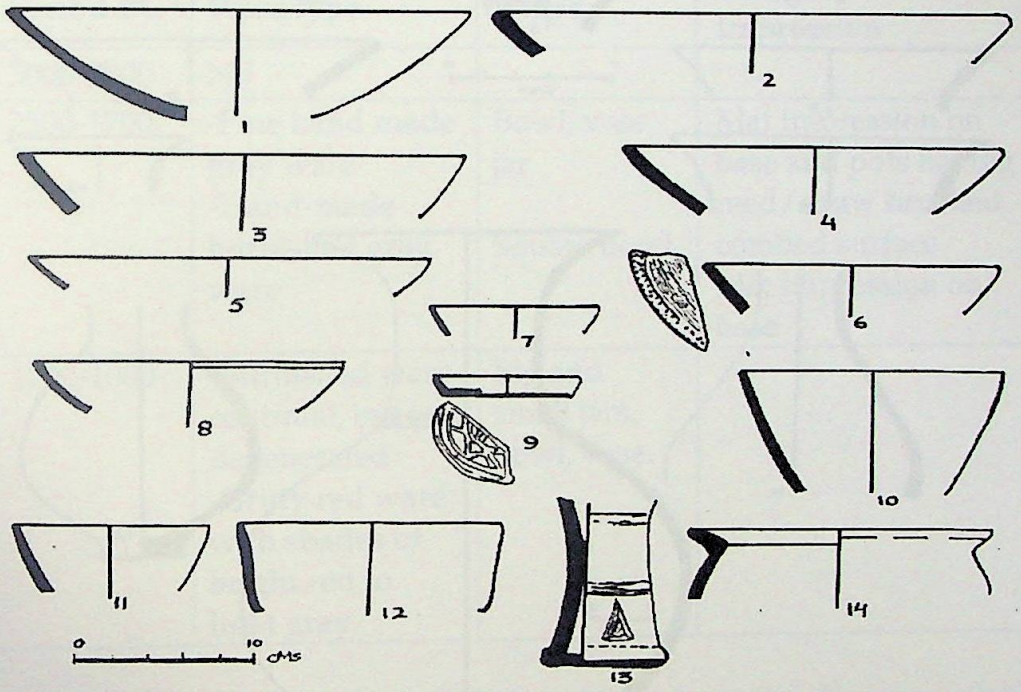

Fig. 39 Burzahom black burnished vessels

1-8 Basin with shapeless rim, 9 shallow basin with straight flat base, 10-11 deep bowl with tapering sides, 12 deep bowl with straight base, 13 stem piece of stand (dish on stand), 14 wide mouthed pot with flaring rim and incipient neck.

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48 R.K.Pant, Clarie Gaillard, Vinod Nautiyal, G.S.Gaur and S.L.Shali, "Some new lithic and ceramic industries from Kashmir", *Man and Environment*, Vol VI, 1982, pp 37-40.

49 *IAR*, 1981-82.

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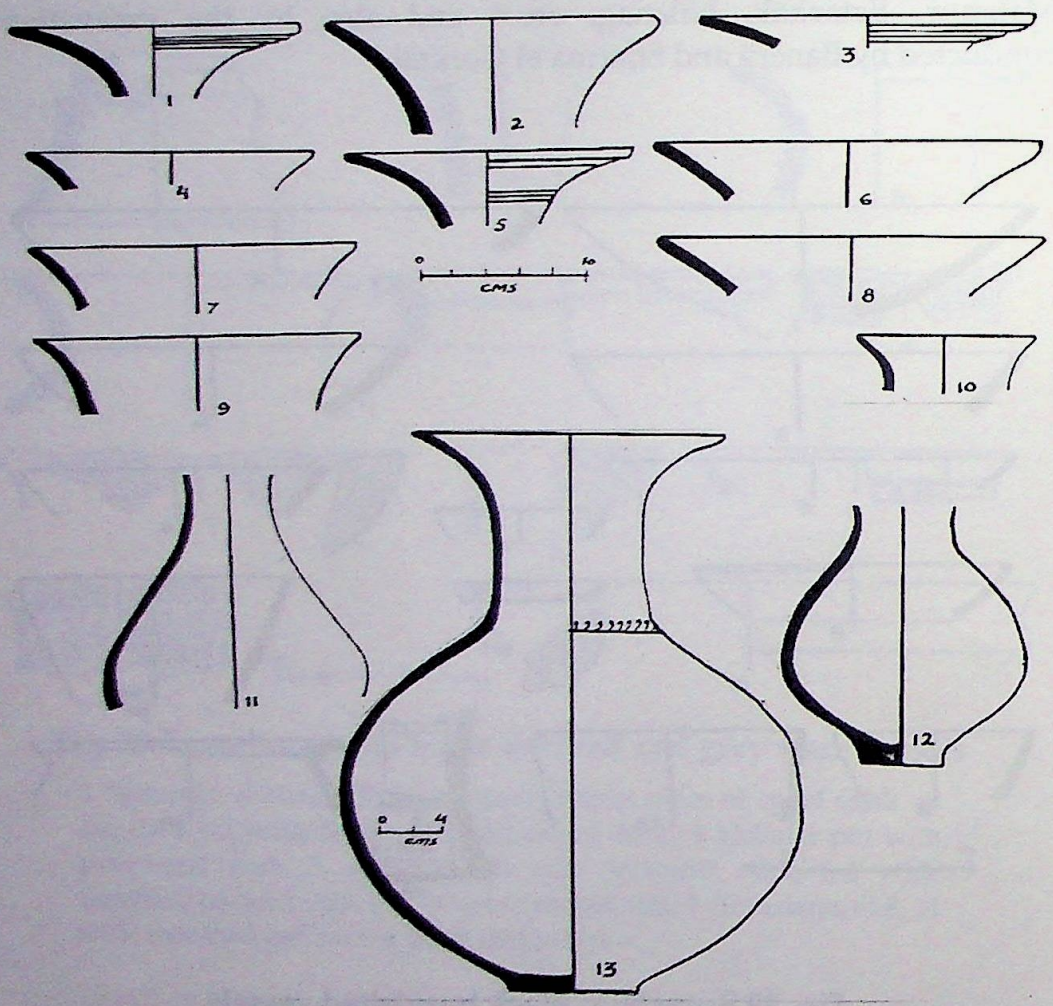

Fig. 40 Burzahom black burnished vessels

1-10 Flaring rims of pots, 11 globular pot with long neck, 12 long necked globular pot with pedestal base, 13 globular pot having flaring rim, long neck carrying notched design, globular body and pedestal base.

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The new evidence from these excavations invalidates the sequence of pottery development proposed by Khazanchi. Saar gave a sequential development in an order that is given in the following table.[50]

Table 2

Period BC	Ware type	Shape	Design/ Impression
3000-2500	Nil		
2500-1700	-Fine hand made gray ware -Hand-made burnished gray ware	Bowl, vase, jar Square bowl	Mat impression on base and pots having reed/straw brushed combed surface Mat impression on base
1700-1000	-Burnished ware continue, but is degenerated -Gritty red ware with shades of bright red to light gray.	Big and small jars, bowl, vase.	

He, too, provides limited information about the shapes available in different types of the pottery wares. This deficiency is overcome by the details provided by Pant. He categorizes the hand made pottery into four types, against the three types of Saar, on the basis of their texture, technique of pot building and evolutionary sequence he thought was available at Burzahom as was at many places in Kashmir. His detailed account is classified in the following table.[51]

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50 S.S.Saar, *Archaeology: The Ancestors of Kashmir*, pp23-25, 41-42.

51 R.K.Pant, *IAS and ISPQS*, 1981.He gave shape names mostly in the Kashmiri for which appropriate English names are given wherever possible. H.D. Sankalia has on the other hand classified these potteries in the following shapes:

1) Hemispherical bowl with a ring base, 2) bowl with outgoing sides-with a possible stand, 3) deep bowl or cup with straight sides or outgoing sides, 4) funnel mouthed vessel (lower part unknown), 5) small elongated vessel with bulging

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Table 3

Period BC	Ware type	Shape	Design/ Impression
3000-2500	X	X	X
2500-2000	-Thick course hand made gray ware	*ledj or handi, veer, tsod* (vase)	Deep but irregular brush marks
2000-1700	-Fine hand made gray ware -Hand made black burnished ware having gray and black shades with recessional red	*martabana or surai* (long necked jar), *pyala* (bowl shallow or round cup), *tour* (bowl deep), *aniuth* (dish deep), dish on stand, *veer, dul* (globular pot)	Deep incised brush and scraping marks and the rim of pot having incised nail decoration
1700-1000	-Hand made gritty red ware	*note* (jar), *tsod* (vase), *pyala* (shallow/ cup or bowl), *toak* (dish)	

Not only his scheme of sequence but also the pottery types found during the excavations at Gofkral is more or less supported by Banerji and Sharma, as is short listed in the following table[52]. Gofkral pottery figures (41 & 42) however do not give any idea about the shapes available in different pottery wares.

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belly, cylindrical neck and ring base, 6) large high necked jar in steel grey ware, 7) small wide mouthed vessel with a beaded rim, 8) a small thick based dish or plate (usually these are used for kneading dough, though the vessel here is comparatively small), 9) stand with a triangular perforation and parallel grooves on the body, *The Prehistory and Protohistory of India and Pakistan*, poona,1974.

52 *IAR*, 1981-82.

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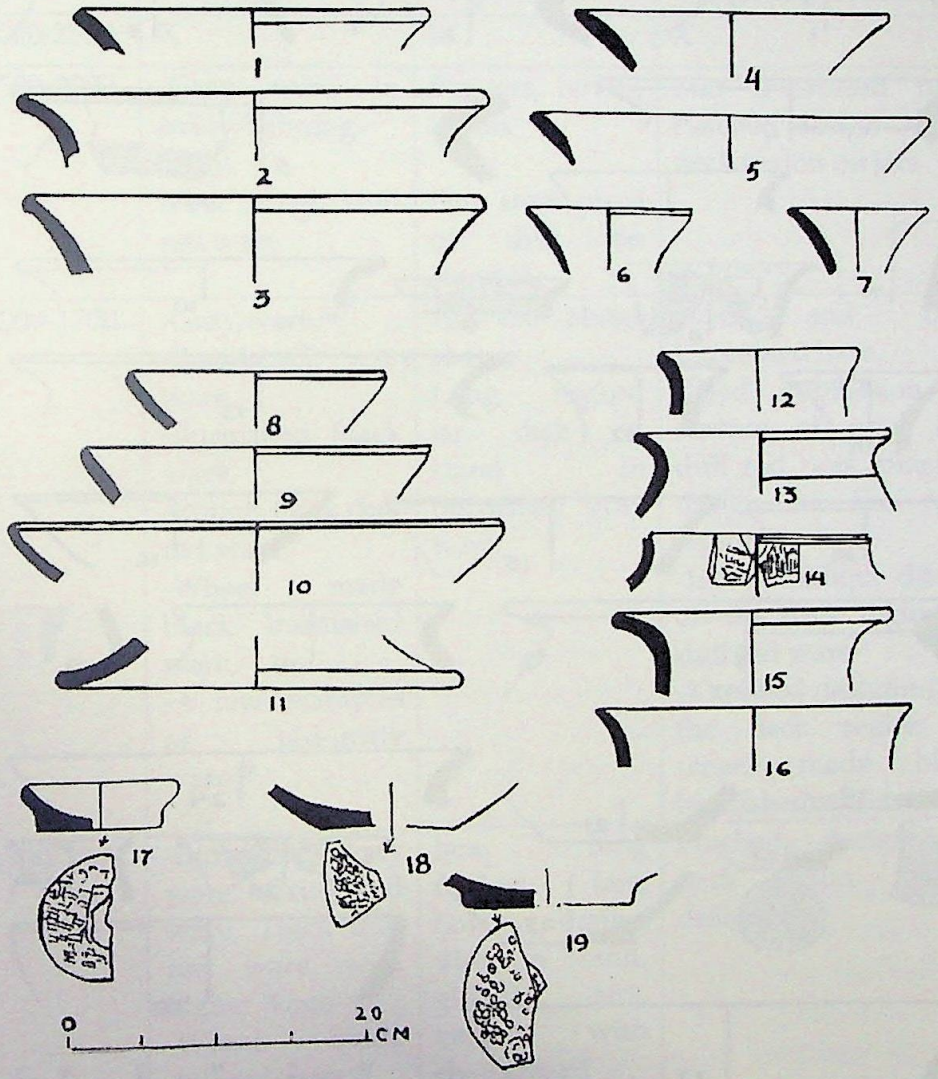

Fig. 41 Grey & dull red pottery, Gofkral IB

1-7 Flaring rim of wide mouthed pot, 8-10 basins, 11 base of stand (dish on stand), 12-16 open mouthed pot, 17 flat bottomed shallow dish, 18 flat bottomed basin, 19 flat bottomed dish.

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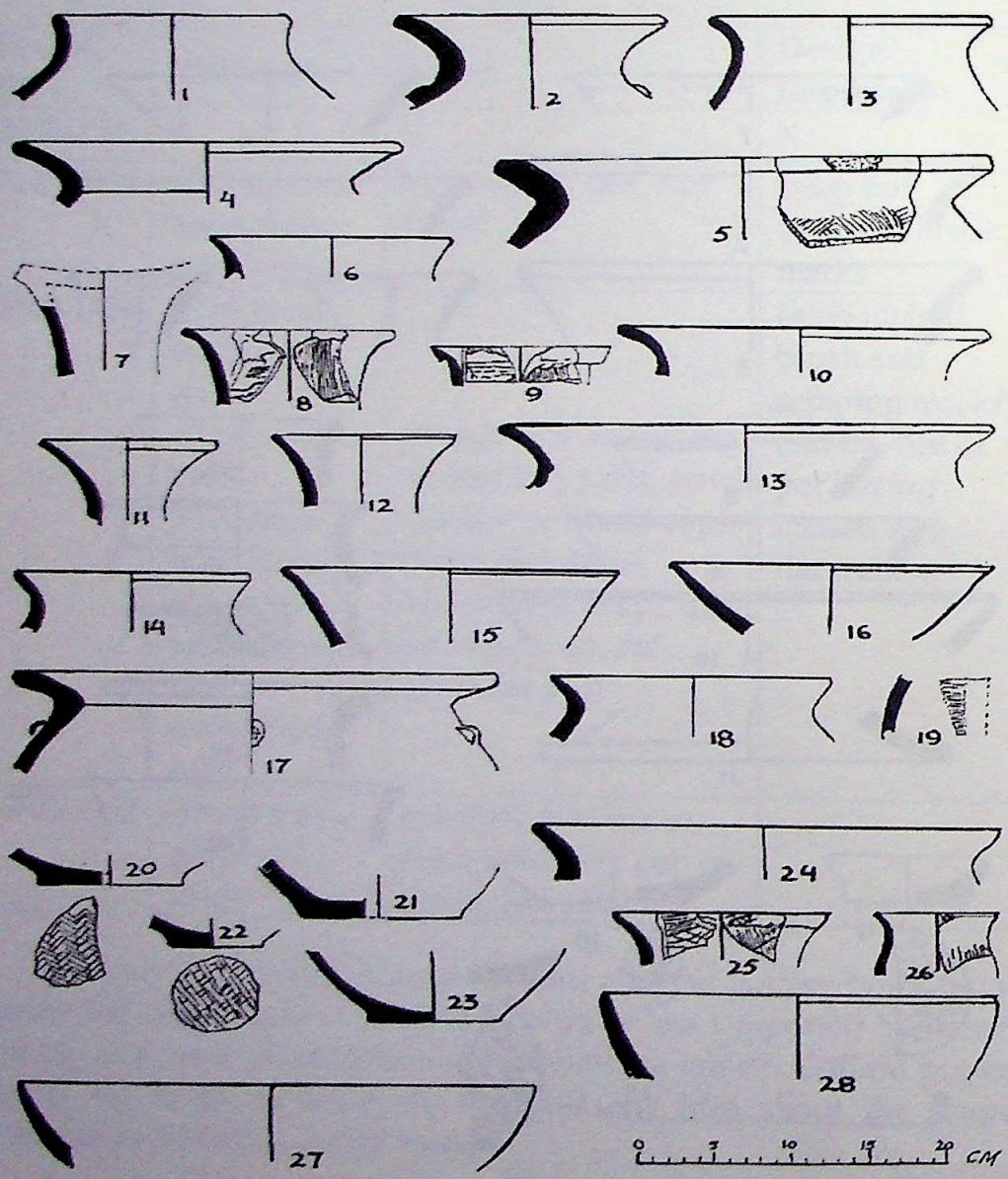

Fig. 42 Gofkral pottery period IC

1-3 Wide mouthed globular pots, 4-5 open mouthed pots, 6,8-9 raised necked pots, 7 stem piece of dish on stand,10&13 wide mouthed incipient necked pots,11-12 long necked flaring rimed pots, 14,17-18 &24-26 wide mouthed globular pots with incipient necks, 15-16, 20-22 & 27-28 variants of bowls

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Table 4

Period BC	Ware type	Shape	Design/Impression
3000-2500	X	X	X
2500-2000	-Gray ware in overwhelming %age, -Few rough dull red ware	Big jars, bowls, basins One stem piece of dish on stand.[53]	Mat impressed base, Pinched design on the neck region on jars
2000-1700	-Gray ware,[54] -Burnished gray ware, -Burnished black ware, -Rough thick dull red ware, -Wheel made black burnished ware, -A few examples of red-gritty ware.[55]	All the above shapes Long necked jar, dish on stand in burnished gray ware	-Mat and cord impressed base, -Reed impression on surface of gray and dull red pots, pinched design on the neck region.[56] -Incised oblique design on the neck region in dull red ware -Knobbed designing on the neck region of wheel made black burnished ware
1700-1000	-Burnished gray ware, -Gritty red ware, Thick dull red ware with higher %age -Wheel made dull red ware.[57]	Jars, long necked jars, bowls, basins, dish on stand, globular jars, vessels with channelised spouts	Pinched design on neck region, incised design,

53 A. K. Sharma, *Puratattva*, 1982.
54 *Puratattva*, 1982.
55 *Puratattva*, 1982.
56 *Puratattva*, 1982.
57 *Puratattva*, 1982.

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It will be appreciated from the above four tables that there is no conformity in defining various pottery types which have been mainly separated out on the basis of their colour or texture. There are two distinct grey wares, one coarse and the other fine, reported from these sites. Besides the differences reported earlier in their matrix, the two grey wares also differ in their appearance and thickness. The coarse grey ware is thick-walled, therefore heavy, and coarse in appearance and texture. On the other hand the fine grey ware is thin and has fine texture. In addition it has deep incised scraping or brush or reed marks on the outer surface, thus it is known as combed ware or cord impressed pottery. When struck this pottery emits a ringing sound. Pant has found that thick grey ware pots show irregular fracturing but the cores are more or less uniform in grey colour and their matrix is fine but porous while the fine grey wares are uniformly ash grey and have medium to thin fabric and they show regular fracturing and their matrix is fine and less porous.[58]

The excavators at Burzahom and Gofkral have not distinguished between these two grey wares. While Khazanchi has not mentioned fine grey ware Saar does not mention coarse grey ware having been excavated at the site. These two pottery types are extant from other sites in Kashmir.[59] At Gofkral the grey ware that is said to have appeared between 2500-2000 BC is not mentioned as carrying any impressions (therefore was plain) as the grey ware pots that emerged subsequently between 2000-1700 BC carried reed scraping marks or impressions on the outer surface. It is therefore significantly plausible that the fine grey ware appeared only after the first pottery that was thick coarse grey ware.

In addition to the thick coarse grey ware, Khazanchi as well as Banerji and Sharma recorded the appearance of thick coarse dull red ware at the beginning of pottery making. Khazanchi further explained that the thick coarse dull red ware has shades of brown and buff. Our studies, on the basis of pottery collections from various Neolithic sites, have shown that the thick coarse ware with the dull red shades is not a

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58 *IAS and ISPQS*, 1981

59 Aijaz A. Banday, *Circle of Inner Asian Art*, 2003; see also table 5 infra.

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separate group of pottery ware, but part of the thick coarse grey ware. In fact some of the thick coarse pots have attained various shades of grey and black including dull red to buff, on account of availability or deficiency of oxygen supply during the firing stage of the pots. Additionally, *inter alia* greyish pots contained more organic matter in the clay while the reddish pots had more iron compounds present. Many pieces of thick coarse grey ware show either shades together, grey or black as well as dull red or buff, leaving no scope to group the thick coarse grey ware and thick coarse dull red ware separately. Like wise the fine grey ware pots have also attained the shades of dull red or buff shades without forming a separate group. Thick coarse grey ware and fine or combed grey ware is as such a broad classification for the two pottery types that emerged respectively between 2500 -2000 BC and 2000 -1700 BC.

There is unanimity in presenting the appearance of burnished ware between 2000 -1700 BC. But Saar as well as Banerji and Sharma differentiate burnished ware into grey-shaded handmade ware and black-shaded wheel-made ware. Khazanchi first recognized only the wheel made burnished ware but subsequently agreed that this entire ware is only handmade. Our studies show that not only the grey shades but also the black shades of burnished ware are both handmade. At the risk of repetition let us note again that it is by the application of mechanical friction to the leather hard surfaces of the pots that burnished surfaces are achieved. For example, the burnished pots at Kaneer and Aripanthan sites are exceptionally fine and lustrous looking as if polished. The potters seem to be more advanced in the application of burnishing than many other sites. Most of this pottery is only black in colour and retain hand impressions on the inner sides of the pots. On the whole the burnished pots were more watertight, their fabric less porous, and have an agreeable glossy surface which, after firing, is lustrous or polished in appearance. Depending upon the degree of application of burnishing the appearance of gloss and smoothness of surfaces has sometimes given the wrong impression that some of these pots, irrespective of their shade, were wheel-made. The non-burnished areas, particularly the inner sides of the burnished pots, have definite handmade impressions with coarse to rough surfaces.

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Radiographical studies have also proved that the burnished pots were hand made and have fine to medium fabric; fracturing irregularly and crumbling to pieces.[60]

Table 5

	Ware types	Present + or Absent _		
Site	**Coarse grey**	**Fine grey**	**Burnished**	**Gritty red**
Aripanthan	+	+	+	+
Balapur	+	-	+	+
Botingoo	+	+	+	+
Bomai*	+	+	+	+
Begagund	+	+	+	+
Gopas Udar	+	+	+	+
Hariparigom	+	+	+	+
Hayatpur	+	+	+	+
Jayadevi Udar	+	+	+	+
Kaneer	+	+	+	+
Khan Sahib	+	+	+	+
Kiri Chak	+	-	+	+
Kuladur	+	+	+	-
Mukam Udar	+	+	+	-
Olchibagh	+	+	+	+
Pampore	+	+	+	+
Panzgom	+	+	+	+
Pinglish	+	+	+	-
Raiteng	+	+	+	-
Romu	-	-	-	+
Sempur	+	+	+	+
Shahpend	+	+	+	+
Somber	+	+	+	+
Tapribal	+	-	+	-
Thajiwor	+	+	+	+
Wanigom	+	-	+	-
Yoh Teng	+	-	+	-

* There are many sites in and around Bomai; all have been grouped here together

60 *IAS and ISPQS*, 1980.

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Khazanchi has not recorded the appearance of gritty red ware even though it is still available at Burzahom. It is a thick type of pottery showing dominance of tempering material even on the surface treatment, which is often sandy in appearance. It shows irregular fracturing and the core appears dark in colour. Saar and Pant however say that it was available at Burzahom during the last cultural stage. It appeared at Gofkral around 1700 BC and it continued to be made until 1000 BC. Most of these four types are found at many other sites as in the table 5[61].

These four principal pottery types therefore mark the presence of a particular stage of the Neolithic period in Kashmir. Among all these four wares, the dominance of the thick coarse grey ware and burnished ware is witnessed throughout the Valley as compared to the other types.

To conclude, it is therefore certain that for about first six hundred years of the culture, between 3000-2500 BC, there was no pottery made. It was the aceramic period which allowed the people necessary time-span for an independent invention of the skilful craft of pot making. What, however, is lacking for such an assertion is the evidence of any tentative effort or experimental stage of pot making, like ill-fired or half baked pottery, both at Burzahom and Gofkral. The pottery that emerged around 2500 BC was in a progressed stage with out noticing in them any kind of experimental stages. However, such a stage was recently found in Botingoo-3, a Neolithic site in Sopore, where some of the thick coarse ware pots are having their cores not fully baked[62]. They are fragile and more thickly made than what is generally found at other place in the Valley. It seems that a tentative effort was therefore made before a good quality pottery was finally produced. For how long it continued remains to be found.

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[61] R. K. Pant, C. Gaillard, *et al, Man and Environment*, pp 39-40; Aijaz A. Banday, *Circle of Inner Asian Art*, 2003 and Mumtaz A Yatoo, *Archaeological Explorations of Sopore and Bandipora tehsils in district Baramulla, Kashmir*, a pre-doctoral thesis submitted to the Centre of Central Asian Studies, University of Kashmir, Srinagar, 2005.

[62] Mumtaz A Yatoo, *Archaeological Explorations of Sopore and Bandipora tehsils in district Baramulla, Kashmir*, Srinagar, 2005.

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Anyway, it is but an invention that could be made at any and all places in the world by observing structural changes that take place in clay plaster, like in a hearth lit with fire that was found in every house at Burzahom and Gofkral from the beginning of the culture. Following the aceramic period the four principal types of potteries appeared one after the other. During the last cultural stage, a new pottery type was wheel-made in red ware which is thin and fine in fabric. The appearance of a new pottery ware during a new cultural stage did not mean that earlier type had all together vanished. They continued to remain in vogue in the subsequent stages without remaining dominant.

The appearance of any type of these pottery types at a given site thus marks the presence of a particular stage of the Neolithic period. Arguably that site was occupied by the people of the relative stage of the culture during the Neolithic expansion of Kashmir. This criterion cannot but hold true in respect of their shapes as a certain pot shape was available in all the pottery wares that emerged in Kashmir at various levels. For example a variety of bowls was made in both the grey pottery and continued to be made in the burnished as well as in the red ware, with little variation in size and depth. Similarly basins, having curvilinear sides sometimes with straight base, were available in all ware types, but their incidence was more in the burnished pottery.

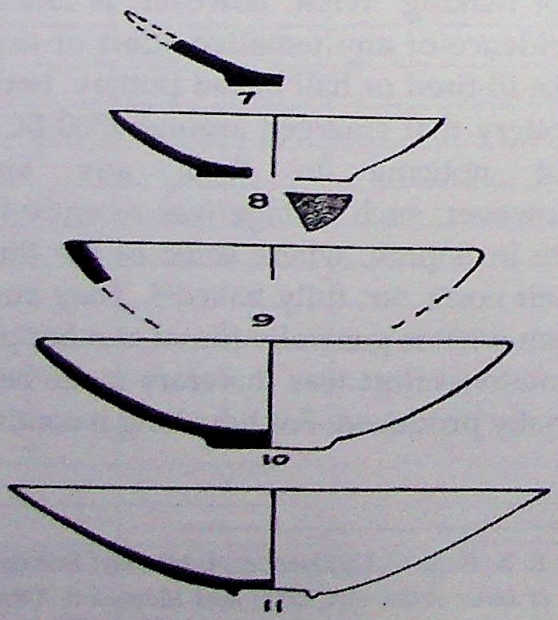

Fig. 43 Bowls from different Sites

7 Coarse grey, 8 fine dull red, 9 fine grey all from Burzahom, 10 fine grey Gofkral, 11 black burnished Hariparigom.

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The pots were varied in sizes but a given shape remained in vogue during the entire period of the culture. For example a variety of globular vessels, sometimes with incipient neck, flaring rim, wide or open mouth but generally having near spherical body with round or flat bottom or hollow stand, were made in all types of ware. However, their size was slightly larger in gritty ware. Some of the vessels in this ware are very thickly made and are very large in size as found at Bomai. Such vessels were possibly used for the storage purposes, like cereals.

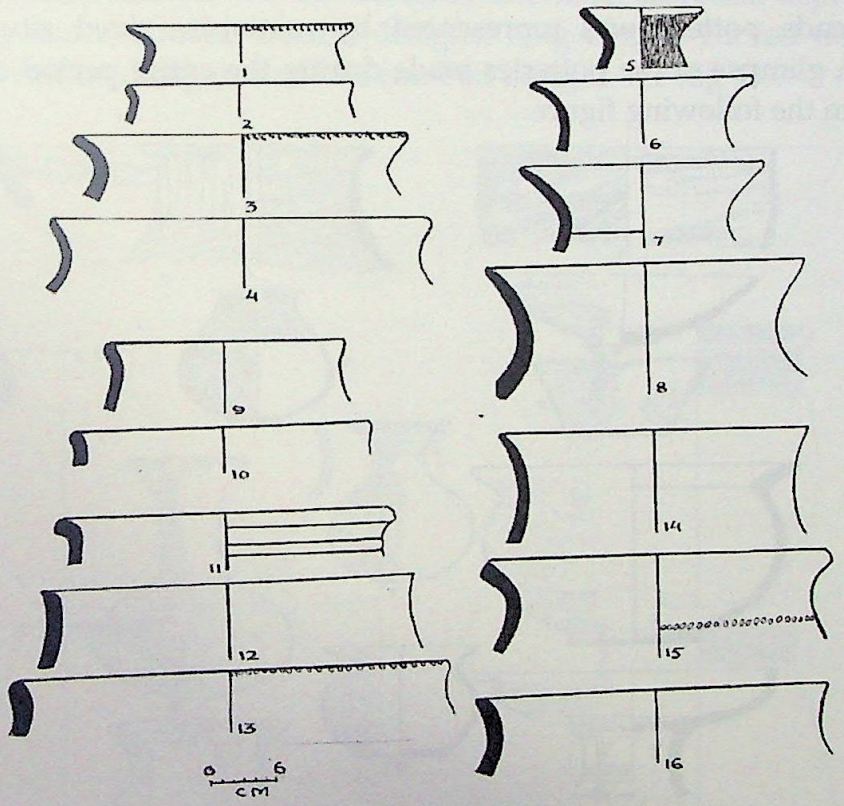

Fig. 44 Wide mouthed pots from various Sites

1 Burnished pot with bone herring pattern rim Kuladur, 2 & 3 gritty red Burzahom, 4 wheel made Burzahom, 5 combed grey Burzahom, 6 gritty red Gofkral, 7 fine red Hariparigom, 8 fine grey Hariparigom, 9 gritty red Aripanthan, 10 gritty red Burzahom, 11 wheel made Burzahom, 12 gritty red Aripanthan, 13 burnished Kuladur, 14 fine grey Kaneer, 15 burnished Kuladur, 16 fine grey Aripanthan.

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As against this, the high necked jar with flaring rim, globular body having flat bottom was the distinctive item in the burnished pottery. Equally important in this ware was the square bowl with a round base, straightened four walls with rising curved top and four corners slightly depressed. What distinguishes the earlier burnished ware from that of the last stage is that the later pottery has a gloss of low order with coarse fabric. During this period the globular pots made in the gritty ware had distinct shapes in wide mouthed pots with flaring rims, collared necks and spherical bodies on round bases. Also by then the wheel-made pottery was represented by miniature sized ritualistic vases. A glimpse of the potteries made during the entire period can be had from the following figure.

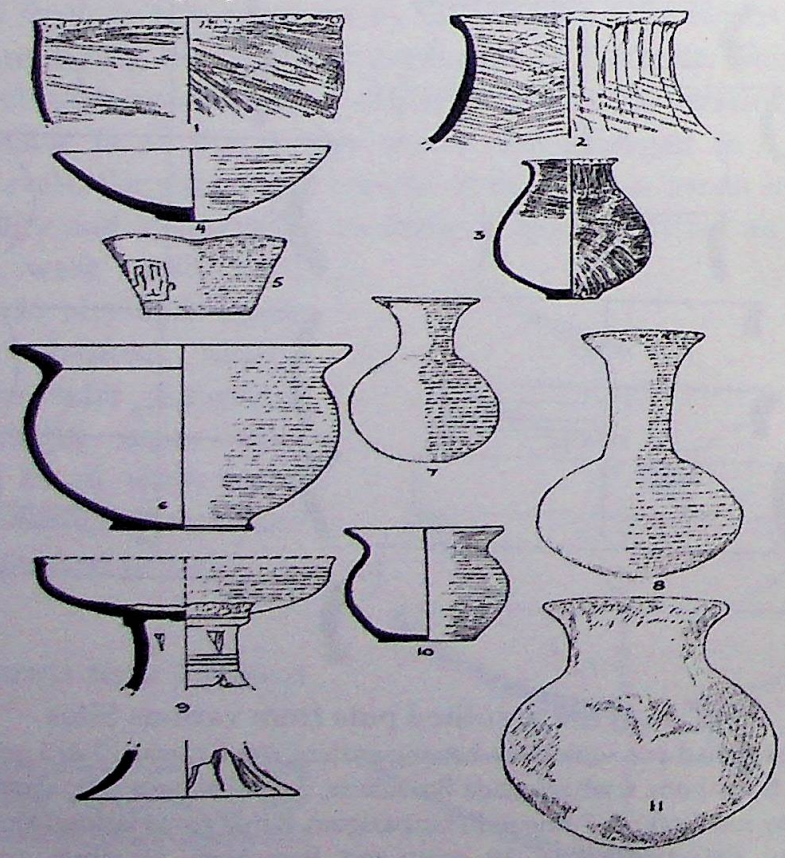

Fig. 45 Vessels of the Neolithic Kashmir

1-3 Combed grey ware, 4 coarse grey ware, 5-10 burnished ware, 11 gritty red ware.

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The virtue of the Neolithic pottery lies in its fine mastery of form and style. The best of these especially was the almost lustrous black burnished high necked jar with flaring rim having shapely rounded body. Its form, a fine blend of curves and bulges, is like an expression of female sprit in art. The potters excelled in giving a definite shape and look to their vessels but seem to have possessed not too much talent for decorations. The best form of decoration, which breaks the monotony of design, is seen on the rims and they are mostly thick carrying roughly denticulated waved designs, alternate elevation-depression designs, raised circular button designs, long looped curved designs, raised bunding designs, nail-like combed designs, etc (fig 46).

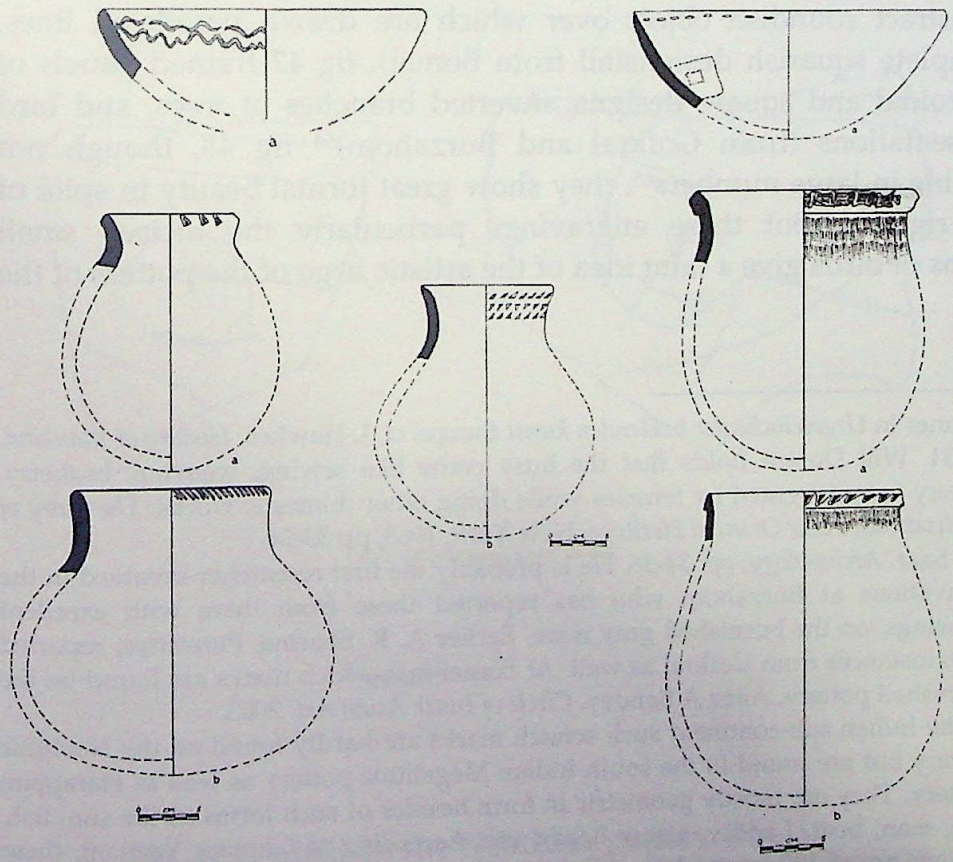

Fig. 46 Notched designs on the Bomai pottery

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Notching and pinching on the rims as well as around the neck portion of some of the globular vessels is also seen as if representing the ornaments, like a necklace, used in the human form. Such decorations may be the reason for some to claim that pottery was entirely expressive of the sex—a feminine work[63], but it is a treatment itself expressive of the decorative taste of the people.

Another such creation was attained by the incised graffiti markings on the exterior side of the pots. Again, whatever may be the conceptual thinking underlying the projections on the vessels, they show a degree of superiority so far as abstract and naturalistic artistry is concerned. The graffiti marks, like scratches drawn haphazardly forming a boat like formation set in front of a mountainous landscape, an abstract roundish object over which are drawn paralleled lines, incomplete squarish designs(all from Bomai), fig 47 framed panels of trapezoidal and square designs, inverted branches of trees, and bird representations (from Gofkral and Burzahom)[64] fig 48, though not available in large numbers[65], they show great formal beauty in spite of their rigidity. But these engravings particularly the incised small designs of birds give a faint idea of the artistic urge of the potters of the times.

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[63] Heomes in *Urgeschiche der biddenden kunst Europe*, cf, J. Hawkes, *History of Mankind*, p 331. Will Durant holds that the busy crafts like sewing, weaving, basketry, pottery were invented by females while doing other domestic works, *The Story of Civilizations, : Our Oriental Heritage*, New York, 1963, pp 33-34.

[64] S.S. Saar. *Archaeology, pp. 34-36.* He is probably the first researcher involved in the excavations at Burzahom who has reported these from there with excellent drawings, on the burnished grey ware. Earlier A. K. Sharma, *Puratattva*, reported such instances from Gofkral as well. At Bomai many such marks are found on the burnished pottery, Aijaz A Bandey, *Circle of Inner Asian Art*, 2003.

[65] In the Indian sub-continent such scratch marks are hardly found on the Neolithic pottery but are found in the south Indian Megalithic pottery as well as Harappan pottery. They are mostly geometric in form besides of such forms as the sun, fish, tree, man, boat, Ladder, arrow heads, etc. According to Ghulam Yazdani, these designs are of 130 types, *Annual Report of Hyderabad Archaeology Department*, 1915-16, pp. 9-10; while B.B. Lal short lists them into 60, *Ancient India*. According to B.B. Lal, taken together these marks may represent the identification marks of potters or their users or else they might be either pictographs or representation of magic.

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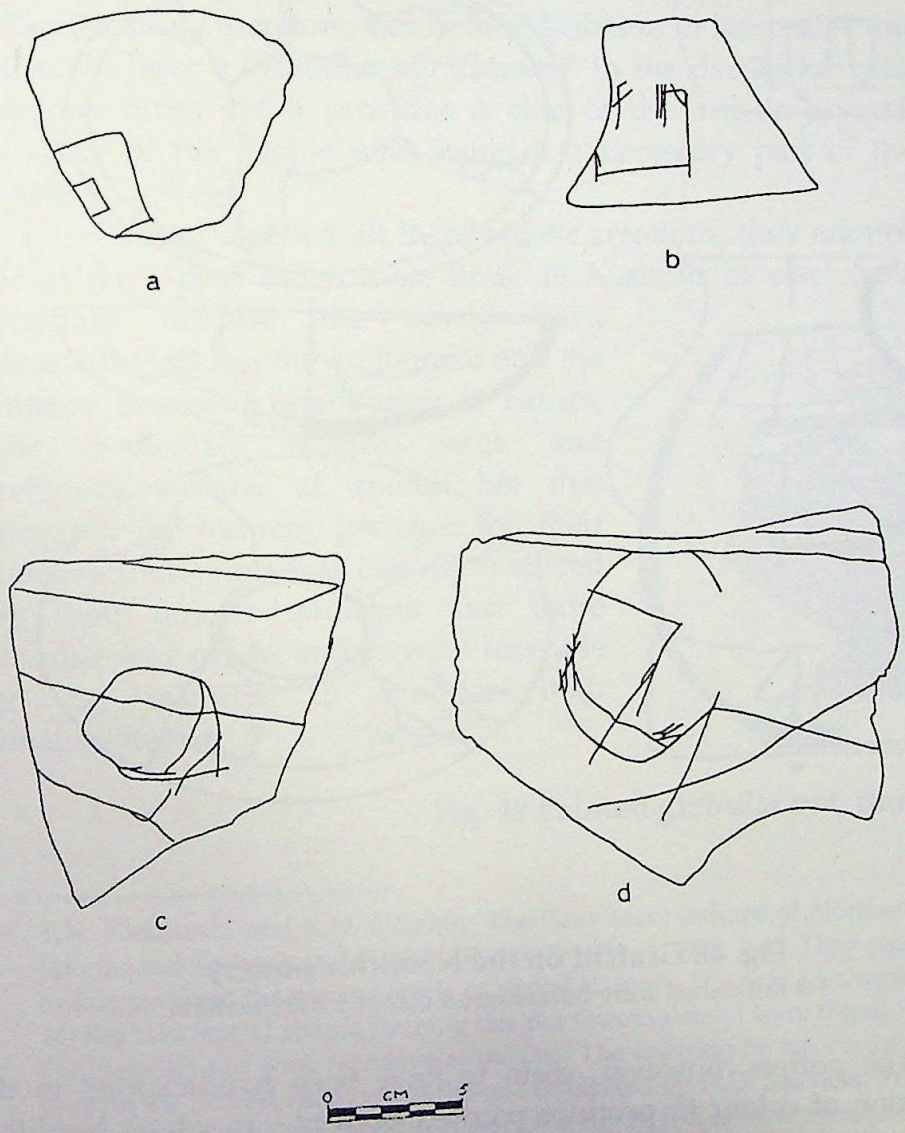

Fig. 47 Graffiti on the Neolithic pottery, Bomai

a) coarse ware, b-d) burnished ware .

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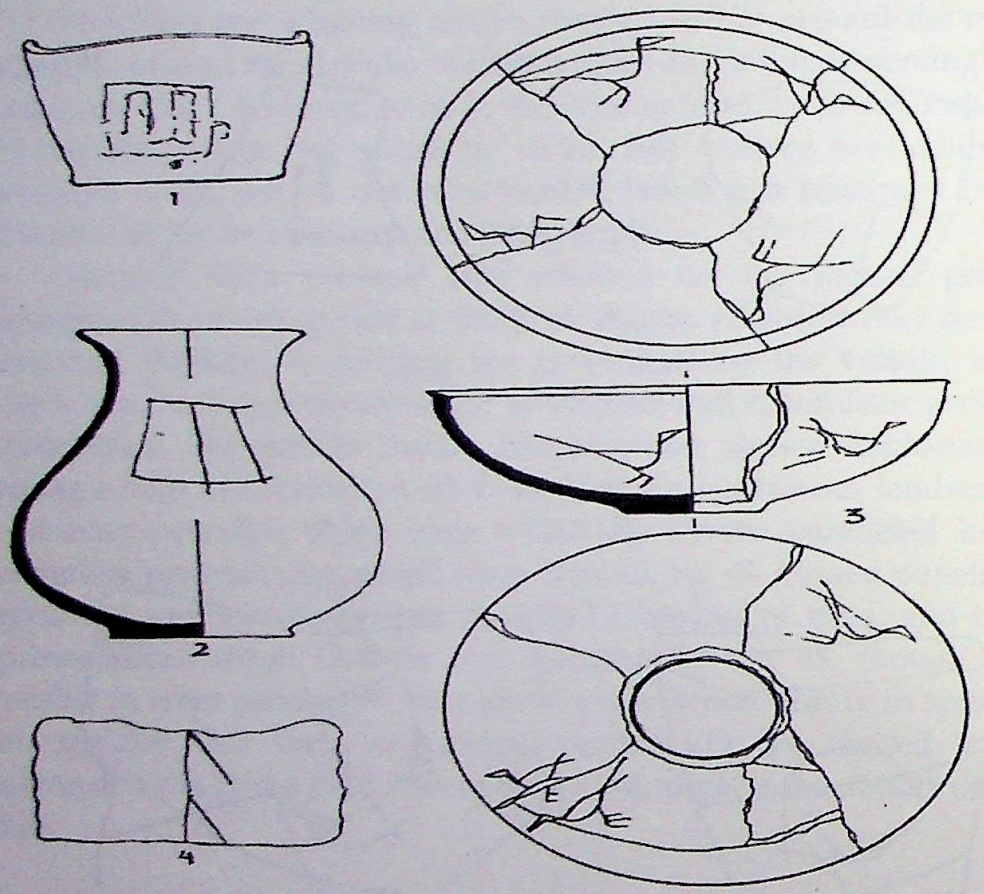

Fig. 48 Graffiti on the Neolithic pottery
1-3 Burnished ware Burzahom, 4 combed ware Gofkral.

The potters, however, seem to have been handicapped in the application of colour to produce painted pottery – in which Neolithic Asia excelled.[66] It is therefore rather curious to find only one large

[66] From many Neolithic sites in Asia, the main pottery types are painted, e.g. in Turkmenistan, Iraq, Iran, and China (A. H. Dani and V. M. Masson, *History of Civilization of Central Asia*, Vol. 1, UNESCO. 1992; P. Sing, *The Neolithic Cultures of Western Asia*, London, 1974; Ping-Ti Ho, *The Cradle of the East*, the Chinese University of Hong Kong, 1973).

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globular pot at Burzahom which is painted in black and has a large horned head of the bucranian bull on its surface[67] (fig. 49). This painted manifestation, therefore, lies in total isolation in Kashmir[68] and though it might have a symbolic significance[69] in the decorative arts of those bygone times yet it provides a clue of the artistic aspirations and practice of the people who found it a necessary part of their living pattern.

Putting together all these artistic creations, they are not as great as in the Upper Palaeolithic times in Kashmir or elsewhere. This is possibly because the newly born peasants 'had lost the excitement and the intense sensuous observation of nature, the immediate magical urge and religious wonder at animal life that inspired the hunters; perhaps, too their unconscious mind was less often stirred in their quieter moments and more routine way of life, and so were less able to be inspired to produce high imaginative art'.[70]

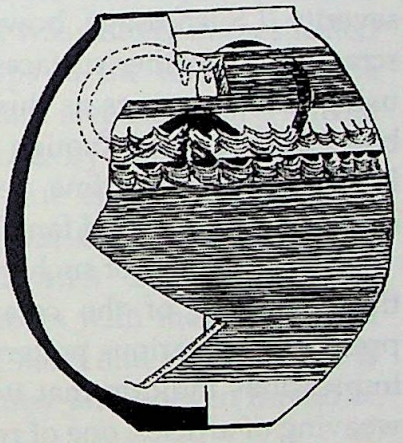

Fig. 49 Painted globular pot, Burzahom

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67 T.N. Khazanchi and K.N. Dikshit, `The Grey ware culture of Northern Pakistan, Jammu and Kashmir and Punjab', *Puratattva*, No. 9, 1980, p 49. They report the find of this pot from the earliest levels of period II, while S.S. Saar (*Archaeology*, pp. 13-14) has said that 11 shards forming this pot (incompletely) were found from period I (Aceramic) and were intrusive at the site. The drawing he has made of it has no eyes on the horned head, while the one published by H.D. Sankalia, *Prehistory and Protohistory of India and Pakistan*, Pune, 1974, fig. 88 K-E has the eyes, possibly made on the analogy of Kot-Diji example.

68 Many such horned designs, painted in black, on such pots are found outside Kashmir, particularly in the pre-Harappan context in India and Pakistan, as at Kot-Diji, Sarai Khola, Banawali, etc.; see infra chapter Conclusion.

69 Infra Chapter VIII.

70 J. Hawkes, *History of Mankind*, p. 334. He further puts it that a perfectly successful but unambiguous decorative art might well be expected in peasant cultures in which women were powerful.

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Weaving:

The material objects like skin cutters, scrapers, knives, awls, needles, etc found at the archaeological sites in Kashmir make it certain to expect that animal skins were widely worked, for their probable use as leather bags for storage and carriage of goods and grains. They may have also served as fur pelts for floor furnishing to provide warmth and comfort, as also utilized for making human dress to resist climatic severity.[71] Such usage, however, entailed processing, like cleaning and scraping the leather surfaces with scrapers, stitching with bone needles using leather strings as threads or buttoning these dresses with small bone points. Even though all such leather goods would have been handy at any given time, yet it seems that with the development of the culture the people had familiarized themselves with the art of weaving.

The earliest of such evidence comes around 2500 BC, that is from the beginning of the ceramic period, as weaving impressions are preserved on various pottery specimens at their bases (Pl. XVIII). These impressions indicate that two types of materials were utilized for the weaving of articles; one of reed /straw and other of cord.[72] As the straw or reed impression on the pottery was carried into the clay that was placed on a reed mat or in a basket during the process of pot-making, it seems probable that such woven material consisted of articles used for floor furnishing, like mats or for the storage of domestic articles like baskets. The pottery impressions further reveal that both cord and reed materials were woven in a uniform pattern wherein warp and woof were interwoven to produce a closely knit material. For such a plain weaving technique, it was rather uncomplicated to spread reed

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[71] No material culture made of animal skin was found during the excavations. Being perishable it is rather difficult to get one. However, what has been suggested by A.H. Dani (*Chilas*) regarding the animal skin used as human dress, we might likewise have had such use of it, (supra note 20).

[72] Many pots are carrying such impressions on their bases found from almost all the Neolithic sites throughout the length of Kashmir. It is reed/straw impression, called mat-impression that is reported from Burzahom, *IAR*, 1960-61 to 1971-72 and from Gofkral *IAR*, 1981-82. Nevertheless, there are many instances which show that cord weaved into thick cloth was also used for the purpose and hence cord impression, *IAR*, 1981-82.

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material, after it was uniformly cut into required size, side by side in opposite quadrennial direction as warp and woof threads to be interlaced alternately with the fingers of the weavers.[73]

On the other hand, the pottery specimens having cord impression on their bases are indicative of textile production which seems to have developed a complex manufacturing technique. In the absence of evidence of fibrous plants like cotton grown then in Kashmir, the possible source of raw material for textile yarn seems to have been the fleece of sheep, the animal that was widely domesticated during the period.[74] After the necessary steps of the teasing out the wool, spinning and twisting was the important step necessary for the textile weaving.[75] Spinning is forming of threads by drawing out fibers and twisting these; the processes carried out either separately or simultaneously. Drawing consists in pulling out the fibers lengthwise by arranging them in more or less parallel order. Even though the process can be handled by easing out the fibers with the fingers and twisting between the two hands or between a hand and a thigh, yet it is laborious, time-consuming and produces clumsy and uneven thread of shorter lengths.

To overcome the handicapness the spinning and twisting of woollen fibers was facilitated with the use of spindle whorls. The terracotta and stone specimens of such whorls that have been found during the excavations in Kashmir[76] are spherical and perforated at the centre for the reception of the spindle shaft, like that of bone awl. These whorls when rotated with fibers attached to the spindle shaft tip, wind long twisted thread. Such spun thread seems to have been used in the weaving of cloth with or without the use of framed loam. While stiff materials, like reeds used in the mats could be woven with the fingers,

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73 Grace M. Crowfoot, 'Textiles, Basketry and Mats' *A History of Technology*, eds. C. Singer, E.J. Holm Yard and A. R. Hall, Vol. I, Oxford, 1954, p. 425.

74 Infra Chapter VII.

75 Grace M. Crowfoot, *A History and Technology*, p. 425.

76 Terracotta and stone spindle whorls are reported first from period IC at Gofkral, *IAR*, 1981-82, along with was also reported from the period the pottery having cord impression on their bases.

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woollen threads on the other hand could be handled on warps stretched out and held firmly.

An effective type of device might have consisted of two bars pegged out horizontally on the ground with the warp threads held tight between them.[77] The woof threads can be darned in with the hands or bone needles; or a shed-rod devised to raise one set of warps and heddles used for the raising of another set. Instead of the horizontal loom, there is even a possibility of the upright loom being used in the weaving of textiles. In this case, an upper loom held the warps in an upright position and the warps at the bottom were tensioned by using loom weights.[78] Such loom weights as found during the period might have been spherical sling balls, also called weights, which would have allowed the weaver to work at the top, as in the modern framed loam, as against the double beam loom which is worked at the bottom.

A fabric thus produced in either way would show plain weave with regular alternation of warp and woof thread as in the pottery impressions. However, as fabric material is softer than that of say reeds, the weave threads in the textile seem to have been pushed together during the course of weaving with the help of an implement known as a card, a saw-edged comb-like bone tool an example of which was found at Burzahom.[79] Such a weaving technique might have ultimately produced thick coarse woollen cloth, as impressed on clay during the process of pot making. The stitching of this material for tailoring of garments was finally done with the fine quality of bone needles, as a large number of these was found at the sites,[80] carrying through their pierced eyes the strings of the spun thread.

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[77] Grace M. Crowfoot, *A History of Technology*, pp. 425-27. This technique is still used for the delicate hand made *pashmina* fabric before the woof threads are loomed in.

[78] Grace M. Crowfoot, *A History of Technology*, pp. 427-28.

[79] B. M. Pande, 'Toilet objects, combs', *An Encyclopedia of Indian Archaeology*, Vol. I, Ed. A. Ghosh, Delhi, 1989, p. 345. It is reported that the bone tool found from period I was for weaving, dressing wool or removing hair from skins of animals.

[80] 117 bone needles are reported from Burzahom alone besides 88 awls, supra Chapter III.

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Chapter V

THE TOOLS
THEIR FUNCTIONS AND TECHNOLOGY

The tool assemblage of Neolithic Kashmir is mainly represented by stone and bone types. There are some metal types also but they are in limited number and form. Some miscellaneous objects of utility have been grouped together here for the sake of convenience.

During the course of excavations at Burzahom and Gofkral, a large number of implements were found. At Burzahom alone about 2000 bone tools were found,[1] some of which were fashioned out of antler horns. They comprise harpoons, spear points, daggers, scrapers, awls, needles, borers, chisels, arrow heads, polishers and harvesting tools (Pl. XX). Their number was less in the first stage of the culture but it increased almost four times during the subsequent stage, as is known from the following table.[2]

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1 Burzahom details are known from *IAR*, 1960-61 to 1973-74 but without giving their number. However, the number is provided by T. N. Khazanchi, *The Illustrated Weekly of India*, September, 5, 1976, pp 25-27.

2 Mohammad Naseem, *The Neolithic Cultures of North Western Indo-Pakistan sub-continent*, New Delhi, 1982, p. 176; he has provided the details on the basis of information collected from T. N. Khazanchi which however are in all 1796 from period I and II including surface collection. No such details are known from Gofkral, except the following after *IAR*, 1981-82.

Period IA	27 bone tools comprising mostly points and tiny arrow heads, including two awls, some pierces scrapers and a needle.
Period IB	19 bone tools, mostly points including one spatula, and two pierce cum scrapers.
Period IC	41 bone tools, mostly points including few awls, a spatula, a harpoon and a bone object with four oblique incised grooves.
Period II	20 bone tools including an awl, bone handles and arrow sockets.

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Table I

Tools	Period I	Period II	Total*
Scrapers	6	24	49
Skin cutters	10	21	48
Needles	15	51	117
Awls	12	51	88
Arrow heads	34	137	300
Short dagger type points	27	111	202
Medium dagger type points	9	54	109
Large dagger type points	22	85	178
Pin type points	8	43	75
Double edged points	30	171	360
Horn points	14	60	111
Spear heads	9	38	86
Harpoons	8	37	68
Harvesters	-	2	2
Composite tools	2	-	3
Total	**206**	**884**	**1796**

*The total number of implements includes tools from the surface collection.

Such tools were also found from the levels of the final stage, from 1700 - 1000 BC, but the polish of these tools was not good then as in the earlier stages. On the whole the bone tools were well made with efficient working edges, and their tips, particularly that of micro sized arrow heads, were charred for efficient use. In addition, about 1500 stone tools[3] were also found during the excavations at Burzahom. They comprise points, celts, adzes, chisels, wedges, grinders, pounders, pestles, querns, mace heads, hoes, pickaxes, scrapers and harvesters (Pl.

3 T. N. Khazanchi, *The Illustrated Weekly of India.*

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XXII & XXIII). The number of stone points was comparatively large in the assemblage as is shown from the following table.[4]

Table II: Distribution of Stone tools at Burzahom

Tools	Period I	Period II	Total*
Adzes	18	41	115
Celts	9	38	100
Chisels	5	19	51
Wedges	3	21	66
Points	104	305	528
Sewing knives	1	3	9
Scrapers	2	3	10
Arrow heads	-	1	1
Picks	-	3	6
Hoes	2	8	20
Mace-heads	4	35	104
Sling balls	6	35	122
Grinders	21	56	104
Harvesters	-	2	56
Total	**175**	**592**	**1320**

* The total includes the tools from surface collection.

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4 Mohammad Naseem, *The Neolithic Cultures of North Western Indo-Pakistan*, p. 175; he has provided the details of these tools as per the information collected from T. N. Khazanchi. No such details are known from Gofkral except the following after *IAR*, 1981-82.

Period IA Celts, points, one unfinished ring stone, pounders and querns.

Period IB One point and one broken ring stone.

Period IC One celt, fourteen points, querns, balls, harvesters, with one having incised decoration on one side, and spindle whorls in stone as well as in terracotta. Besides, one stone engraver used by potters for removing excess clay while scraping the pots was also found.

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Likewise tools were fashioned in copper which, however, was used from the middle stages of the culture. Copper objects comprised tanged arrow heads, rings, bangles, antimony rods and hair pins (Pl. XXIV). They also had ornaments made of semi-precious stone beads, paste, steatite, terracotta and bone (Pl. XXI).

Stone tools:

The stone tool technology was fairly advanced and distinct from the preceding Palaeolithic period. As compared to the past, the new tools were smooth, with razor sharp fine cutting edges which advanced the working efficiency of these tools, and thus would have rendered the life of man quite easier. Most of them were made of basalt and a few of felsite rocks (devitrified glass, which is mainly acidic and is equivalent to rhyolite). Since these rocks are of a softer nature, the implements made thereof entailed less labour for chipping and grinding to acquire the desired smoothness and sharpness.

In most cases a large flake were taken from the cores for fabrication of tools, but on occasion's elongated river pebbles resembling tools like grinders or pounders were fashioned by grinding their edges for utility purposes. Even though smoothening and grinding was the technological innovation of the Neolithic people, yet we do not have a complete record regarding the stages involved for the fabrication of these tools in the development of this technology in Kashmir. To define the technology and development of tool making it is necessary to have a collection of unfinished tools at various stages of their make. No such assemblage is reported from our sites. It is only ring stones that are found in such stages of make from various sites in Kashmir. Besides, some celts were collected by us at different sites that show either step flaking or are partly ground to give an idea about various stages of their make. Nevertheless, this tool technology may have had a history similar to others documented elsewhere. For example, B. Subbarao's contribution in tracing the stages of development of the Neolithic stone tool-technology at Ballary and Halagondi is worth appreciating.[5] He found a large collection of

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5 B. Subbarao, *Stone Age Cultures of Ballary*, Poona, 1948, pp. 31-32.

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unfinished tools with primary flake surface and bulb of percussion intact, which, therefore, informs us that the stone tools, like celts, were made of a flake struck from a core. This flake in the first instance was roughly chipped off with the help of a stone hammer to give it the general appearance of the desired shape. The technological stage involved for the chipping was bold, convergent, alternate step flaking which left high ridges and a sharp zig-zag cutting edge on the tool. Subsequently the angles of the ridges on the tool were removed, probably with a pointed tool[6] to perfect the cutting edges called technically battering or hammering. The working edge was further sharpened by employing secondary alternate step-flaking (fig 50).

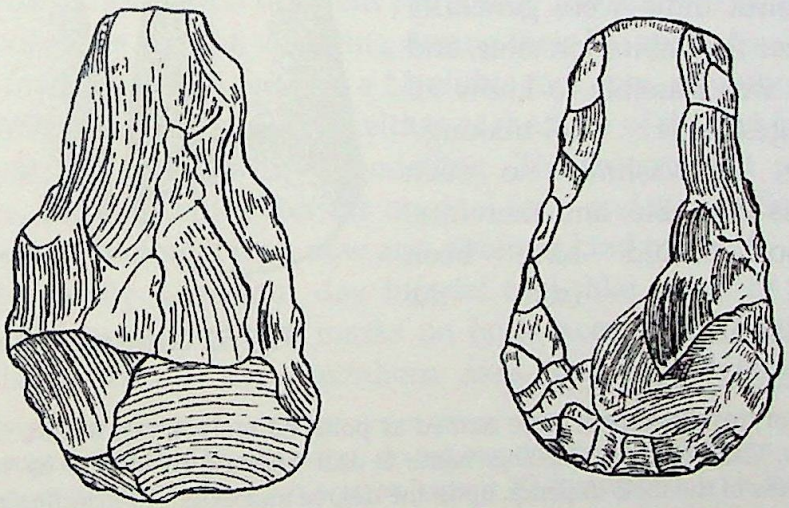

Fig. 50 Rough dressing of a celt in two stages

The tool was thereafter ground on a coarse stone surface with a little water. The process of grinding or frictional abrasion was undertaken in two stages. In the first instance, the excessive roughness was removed by the process of preliminary abrasion so as to render a rounded shape to the tool (fig 51). In the second instance the tool was grounded to obtain a smooth and even surface. In some cases, the

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6 Allchins believed that it was done with a small cylindrical or discoid hard hammer, Bridget and Raymond Allchin, *The Birth of Indian Archaeology*, London, 1964, p. 86.

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excessive abrasion was affected on the cutting edge and its nearby areas which correspondingly produced a gloss[7] on the tool (fig 52).

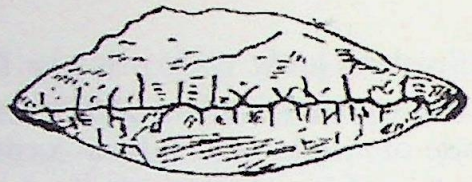

Fig. 51 Abrasion on cutting edge

On systematic analysis of the facts, one understands that the tool-making in Kashmir, too, might have gone through similar stages of fabrication and development to produce a similar and comparable assemblage. However, the factory sites in South India were generally located near the habitation sites, and as such it was possible to know all the stages of tool-making.[8] Contrarily, in Kashmir no such evidence is traceable, and therefore, these tools could have been fabricated away from the habitational sites.[9]

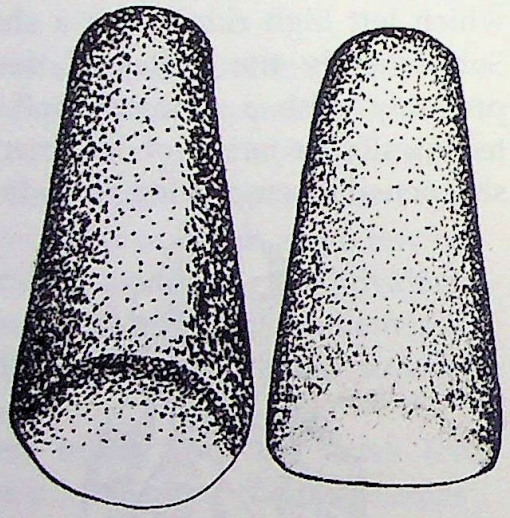

Fig. 52 Grounded celts

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7 Because of this gloss these were termed as polished tools, M. C. Burkit, *Our Early Ancestors*, Cambridge, 1926. This name is still retained by others as well. The smoothness of the tools depends upon the degree and extent of grinding rather on actual polish.

8 Robert Bruce Foot found in Ballary well polished grooves, 7 to 8 inches long and 1 to 1 ½ inches deep, worn by ground of axes, on rock surfaces. These grooves lie parallel together and in close lines within a space of less than 20 inches square. Such grooves were also noticed at Halagondi in Kurnol (c.f. B. Subbarao, *Stone Age Culture of Ballary*, p. 57) and other places in South India, B. Subbarao, *Ibid*, p. 57.

9 The menhirs at Burzahom and Gofkral have many cup-marks, about 2 inches deep. These are round and regular as if worn by the ground of tools, like small tools in bone. But these were planted at these places very late and might have been transported from places where these would have been left as erratic. Unlike these, de Terra and Paterson found a large erratic block (possibly derived from the higher level) on the smooth surface of which were found seven elongated and highly polished (grinded) grooves. These grooves are 2 ½ inches deep and placed in a row next to each other. (H. de Terra and T. T. Paterson, *Studies in the Ice Age in India and Associated Human Cultures*, Washington, 1939, p. 154), like the one's found in South

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Tool functions:

The tools, thus made, attained different shapes according to their intended use. However, we have no definite mechanism to determine the original names and actual functions of the tools. What we generally depend upon is the morphological resemblance and parallels from modern tools besides scientific reasoning. A micro-wear investigation carried out by Pant,[10] to study the microscopic 'use' or 'wear' or 'striation' marks[11] on the functional parts of some of the tools of Kashmir, has shown that the names given to some of these pre-historic tools does not necessarily correspond with their functions. The study has also revealed that some of the tools once used were some times remodelled[12] for a different purpose.[13] The original shape of such of the tools thus kept on changing during their life span. As a matter of fact the form, in which we find a Neolithic tool now, actually may thus represent the shape that it took either at the time of its first fabrication or else at the time of its remodelling. The intermittent reshaping, therefore, did not only affect the original form and size of the tool but also made it functional for a new and different kind of use.[14]

Normally a present day bifacial tool, like a celt or chisel, is having microscopic friction marks on both faces of the cutting edge. Like wise some of the Burzahom axes also bear bifacial marks

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India, supra note 66. They however, do not mention the exact location of the stone block even though they say it was on terrace T3 comparable with Burzahom in height and placement.

10 R. K. Pant, 'Microwear Studies on Burzahom Neolithic Tools', *Man and Environment*, Vol. III,. 1979, pp. 11-17.

11 A tool used for a work encounters friction resulting in microscopic damage on its functional parts. The nature and pattern of damage called 'use marks' or 'wear marks' or 'striation marks', will depend on the factors like, composition of the tool and worked material, mode of tool use, its angle of fall, type of pressure on the tool during operation, body mass or angle under pressure, the time of operation, etc. Studied under a microscope or scanning electron microscope these microwear marks provide an element of objectivity as compared to tool morphology which is a subjective criterion, *ibid.*

12 A hoe initially fabricated and used was reground and reused afterwards, *Ibid.*

13 Like a discarded celt remodelled as a wedge, *Ibid.*

14 For example the wedge became a different purpose tool than that of a celt from which it was made.

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indicating that both the faces of such tools encountered equal amount of friction, as force always remain median and vertical to enable the tool to cut straight into the object of work; as such 'use marks' appear on both the faces and equal in intensity. However, it was also found that some of these celts bear friction marks only on one side while the other is more or less inert. This indicates that only one face of such a tool came into active friction. Further, the direction of marks being parallel to the longer axis of the tool indicates the direction of the tool movement. As these marks are stronger at the edges and weaker towards upper part, it shows that the force applied during the work operation would have remained parallel to the object of work.

On experimentation, it was found that some celts were used like adzes and the presence of friction marks thereon, therefore, are a result of their constant use in the dressing of wood. Contrary to unifacial marked celts, the formation of long and deep bifacial friction marks on some of the chisels are indicative of their being used as axes. The marks here appear diagonally to edge line and are equal in intensity and length on both faces and are comparable with such celts that have similar marks on both the faces. Similar type of friction marks, both in orientation and in intensity, found on some of the celts, were thus indicative that these two types of tools were put to a similar type of use. It was accordingly inferred by Pant that such tools were used to fell trees, to cut wood and to chop meat.

The scientific study and the experimentation carried out have shown that the stone tools were utilised for various functions which could have been multifarious at times. The job carried by man with a tool was some times irrespective of its morphological shape and infact a particular shape would have assisted him in carrying out various jobs together to exploit these tools for his socio-economic survival. To investigate this, a brief description of tools, diverse in shape and size, is given here for broader comprehension of the subject. Even though in the present scientific world, the morphological or ethnographical parallels of the tools cannot be solely relied upon for determining their prehistoric use yet such parallels may definitely help one to arrive at certain conclusions regarding their function.

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The Celt and its functions:

Celts or ground axes found in Kashmir are roughly cylindrical in appearance and are broader at the cutting edge, narrower at the butt end and squarish or elongated in form. Each of these has two broader surfaces and two narrower lateral surfaces. The broader surfaces invariably meet in a gentle or oblique slope to form a median cutting edge, which is convex in outline and very smooth on account of having been formed by a bifacial grind. The lateral sides are thick, square or rounded, tapering in a sharp slope, first horizontally and then in a gentle slope. The lateral sides often intersect at the broader base. The butt end is generally rounded.

Among the large collection of celts, some have convex lateral sides, a slender longish or flattish body and flattish butt-ends. Many of them have sharply sloped cutting edges. A variant among these celts is a shoe-last celt, 10 cms long, having tongue-like projected edges with full ground surface and cutting edge. On the basis of their size, form and cross-section, these celts of Kashmir are classified into two broader categories:[15]

i) Heavily built celts, about 15 cms long, intended for heavy work.

ii) Thinly built celts about 7 cms long intended for light work

Both these categories of celts are further classified into many sub-types according to their morphological diversities.[16] Besides these, mention may be made of celts which are 30 - 50 cms long, such as were found at

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[15] H. D. Sankalia, *Prehistory and Protohistory of India and Pakistan*, Pune, 1974 edition, p. 301.

[16] Sankalia (*Ibid*) further classifies each of these two categories into three sub-types:

Category (i) tools are over 15 cms long and,

a) have ovoid section, round hammered butt, straight ground edge (medial and otherwise).

b) butt is pointed and not hammered, edge is finely ground.

c) the edge is flaring and ground.

Category (ii) axes are about 6.5 cms long and are,

a) fully ground, section lenticular, facetted sides, flaring edge.

b) fully ground, section lenticular, tapering sides, round butt and ground convex edge.

c) adze type – this solitary specimen is 10 cms long and is fully ground and double edged (faceted).

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Somber, near Srinagar and at Turkepur in Bandipur. Like the smaller types these long celts have rounded butt ends, long slender body with lateral sides rounded, and a sharp median cutting edge.

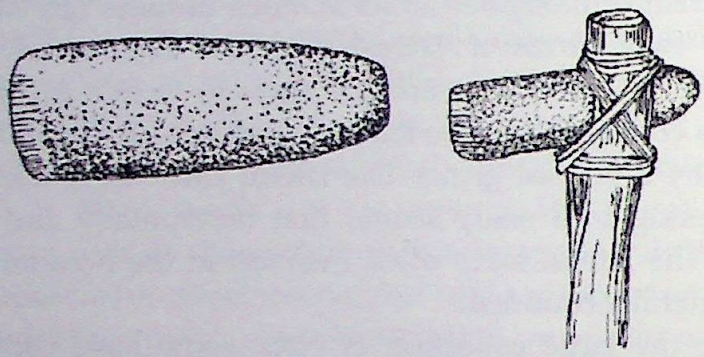

Fig. 53 Slot-hafted axe

We have no evidence pointing to a definite method employed for the hafting of celts by the people for their use. Nor do we have any extent prototype tool to define a function suggesting that of Neolithic period. What we have at present is a metallic woodman's axe[17] almost identical in shape to the celt. The difference, however, is that while the woodman's axe is socketed at the end, the celt on the contrary was devoid of such a perforation. It may, therefore, mean that the celt was either held free-hand for the cutting, chopping, or slicing of fruit, vegetables, meat, grass, etc or was hafted in a perforated wooden handle to compensate for the deficiency of a socket to be used as a woodman's axe, in which case the cutting edge was parallel to the haft. In Western Europe archaeologists have found that the slot-hafted celt worked effectively on wood.[18]

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[17] This first appeared during the Chalcolithic period in the Indus culture, in the Indian sub-continent, Bridget and Raymond Allchin, *The Birth of Indian Civilization.*

[18] M. C. Burkit, *Our Early Ancestors*, p. 69, reports that in 1879 in Denmark many archaeologists found that the Neolithic axe felled forest fir trees without the aid of any other tool. H. D. Sankalia, (*Pre and Protohistory*, p. 84), has quoted Gallard who observed effective wood cutting with this tool. He also cites Coghlan who found that an oak tree 8 inches in diameter was cut down with this tool without injury to the blade.

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Since soft wood like pinus was extensively used in Kashmir for building the living apartments during the period,[19] and as there was no other tool type found that could help in felling the trees, it is quite reasonable to infer that the slot-hafted axes (fig 53) were used to fell the trees and to work on it for various other purposes as well, like dressing, shaping, cutting, splitting, etc for its utilisation for building homes, etc.

Besides being a wood cutting tool, the celt was also used for digging purposes as its marks were found on the wall surfaces of the pits at Burzahom.[20] As the slot-hafted axes with cutting edge parallel to the haft are not technically suitable for digging deep pits as it would split the striking medium, therefore, an improved mechanism might have been employed for the purpose that would leave the marks as found at the site. According to Robert Bruce Foot, a celt becomes a digging tool when it is hafted like a spear-head whereby the butt-end of the tool is fitted in a bamboo cane and this in return is bound to a wooden handle with a rope.[21] Since bamboo does not grow in Kashmir, we, therefore, fitted the celt in an antler sleeve and this way it sufficed to dig the agricultural land already prepared.[22] On its being hafted with

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19 The wooden remains from the post-holes of period I and II structures at Burzahom were of pinus while charred remains used possibly for fuel, fire. were of *Betula, Salix* and *Ulmas*, G. M. Buth and R. N. Kaw, 'Plant husbandry in Neolithic Burzahom, Kashmir', *Climate and Geology of Kashmir and Central Asia, the last 4 MY*, New Delhi, 1985, pp. 109-110; the charcoal record from all levels was of *Pinus wallichiana, Picea smithiana, Cedrus deodara, Parrotioppis jacquemontiana, Quercus* sp., *Betula utilis, Ulmas wallichiana, Celtis australis, Aesculus indica, Buxus* sp., *Juglans* sp., *Platanus orientalis, Fraxinus excelsior* and *Ficus* sp., F. A. Lone, M. Khan and G. M. Buth, 'Five thousand years of vegetational changes in Kashmir: The impact of Biotic factor'. *Palaeoclimatic and Palaeoenvironmental Changes in India*, New Delhi, 1988, p. 165; and from Gofkral *Pinus wallichiana* (IA), *Aesculus indica* and *Juglans regia* (IB) and *Pinus wallichiana, Picea smithiana, Buxus wallichiana, Ulmas wallichiana,* and *Pronus cornuta* (IC) were identified as the woods utilised there, *IAR*, 1982-83.

20 T. N. Khazanchi, *The Illustrated Weekly of India*, Sept 5, 1976, p. 26.

21 Robert Bruce Fort, *'Indian Prehistoric and Protohistoric Antiquities in Govt. Museum Madras*, 1916.

22 This we found sufficed to dig around saplings like a hoe.

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a handle, with the cutting edge slightly at a right angle (slanting or leveled) the celt was found to serve as a digging tool (fig 54).[23]

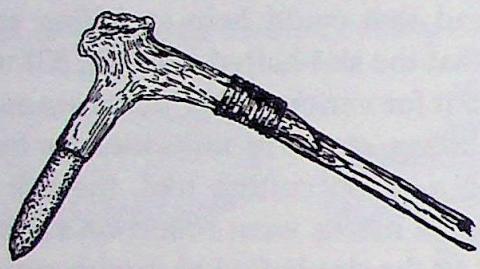

Fig. 54 Celt as a digging tool

Such hafted celts, in particular measuring more than 15 cms in length, might have been employed for digging operations. On the other hand the celts which are as long as 30 - 50 cms, as found at Somber and Turkepur (Pl XI.3), are rather difficult to be hafted in any of these ways. Being heavy in weight these are even difficult to be managed as free hand tools. For such reasons and for their extraordinary length as well as their find from the agricultural fields these tools seem to have served as ploughing tools, used as cattle drawn ploughing shares in agricultural digging. What this indicates is that the people at an advanced stage of their cultural development knew ploughing as well[24], which could have been carried out with the cattle force that they domesticated. This could have happened only after 2500 BC when the animal was domesticated in Kashmir.

The 'double edged pick' as found at Burzahom certainly might have been used for effective digging operations. This rare specimen has a rectangular section with faceted and fully ground surfaces and

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[23] In this way it did help us to dig virgin soil but not as efficiently as an adze type tool or hoe did which has one side slightly convex and underneath side almost straight.

[24] The earliest archaeological evidence of cattle drawn ploughing in the sub-continent has come from a pre-Harappan site of Kalibangan in Rajasthan, Bridget and Raymond Allchin, *The Rise of Civilizations in India and Pakistan*, New Delhi, 1983, pl. 6.30, p. 161; in Western Europe long bars of flint about 25 cms in length found from the Neolithic sites have worked as part of plough, M. C. Burkit, *Our Early Ancestors*, p. 55, while as at Kalibangan the tool used for ploughing has not been located.

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perfectly made perforation at the centre[25] for employment of a haft (fig 55). Since this pick resembles a modern metallic pick-axe, which has an adze type cutting edge on one side and pointed end on the other side of the central perforation, it is very likely that this tool might have been employed in the digging of pit-chambers and for use in agriculture.[26]

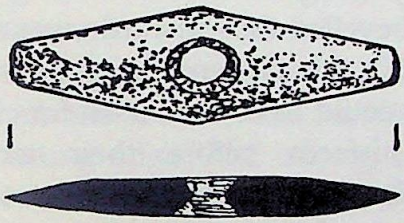
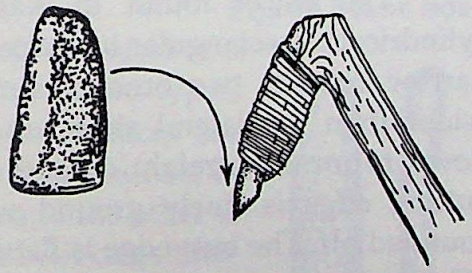


Fig. 55 Double edged pick

The Adze and its functions:

Fig. 56 Adze as carpenter's tool



An adze in general appearance is celt-like, but is slightly thin and cylindrical and is usually made on a flake. One of its broad faces is flat, while the other is somewhat curvilinear, which meet at the edge. The cutting edge is unifacial on the curvilinear side. It is bevelled; finely ground and almost razor sharp whereas the entire surface is rounded off. These tools are generally smaller than axes measuring on an average about 10 cms and have a few types.[27]

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25 It is broken at the hole in the centre and only half of the tool is available.

26 Even though this is probably the most efficient tool to carry the digging operations, yet the perforation in its centre, the length of the working ends and the nature of the material used for its fabrication makes it very vulnerable for an easy damage.

27 H. D. Sankalia, *Pre and Protohistory*, p. 302, divides the Burzahom adze into four groups:

i) adze with flat, sharp butt, section biconvex, tapering sides and convex edge.
ii) adze with broad cutting-end, almost fully ground body and faceted bevelled edge.
iii) similar to (ii) but has steeply sloping sides intersecting with the lower surface.
iv) this is a rare type having parallel sides, convex edge and is fully ground.

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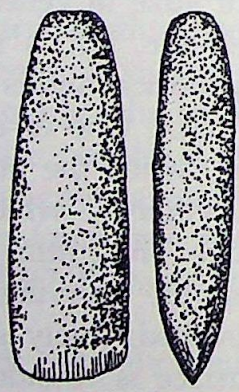
The adze is in appearance almost similar to the present-day carpenter's metallic adze. The difference, however, being that modern tool is socketed to hold a haft, while the Neolithic tool is without any such arrangement. This short-coming, however, might have been effectively overcome by tying the tool to an angular haft so that the cutting edge, with its bevelled face inwards was held transversely to the handle (fig 56). Like the modern carpenter's adze, the Neolithic adze hafted in this way could have been used for chipping, slicing, and dressing of timber surfaces before their employment for the construction of habitational apartments. Besides this purpose, such a hafted adze may have even been employed for digging the earth as it shaped like a hafted hoe.[28]

The Chisel and its functions:

Fig. 57 Stone chisel



The chisel found in Kashmir is narrow, cylindrical or rectangular in shape, very much like a narrow celt. Its two broader surfaces are slightly wider than the lateral sides, and taper half way down to form a straight cutting edge. The bifacial cutting edge is finely ground while the body is rounded off. The butt edge is flattish and round (fig 58). On an average it measures 10 to 15 cms, and has limited types.[29]

The stone chisel is a prototype of the metal chisel used today by carpenters. The difference is that unlike the Neolithic chisel, the modern chisel is fitted in a wooden handle to be

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[28] A. H. Dani holds that this tool served as hoe where the flat face was underneath during digging. *Prehistory and Protohistory of Eastern India*, 1960, p. 47.

[29] H. D. Sankalia, *Pre and Protohistory*, p. 302, divides these in four groups as:

i) large and heavy, over 15 cms long

ii) small and heavy, about 10 cms long
These two types may be further distinguished by round or rectangular body and straight or convex edge.

iii) long, about 8.5 cms, tapering sides, slightly pointed butt, faceted butt, and faceted sides.

iv) pointed triangular.

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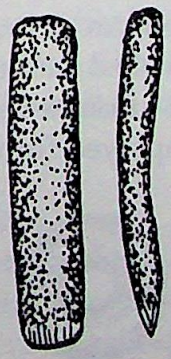
struck with a hammer. In view of the fact that the butt end of the chisel found in Kashmir is mostly hammered, it is very possible that it was struck with a hammer stone on the butt end and used for cutting and splitting operations on wood so as to cut the timber on a wide front across the fiber of the wood.[30]

The Wedge and its functions:

The wedges surviving from Neolithic Kashmir are short, ground axe-type tools in which the broader two surfaces abruptly taper down to form a bifacial cutting edge. The cutting edge as a rule is finely ground while the rest of the surface is rounded off.[31] As these tools have a hammered-out or worn out butt, one may, therefore, logically suppose that the wedges were used as purchases or as intermediary tools for splitting wooden logs by being struck on their butt-ends.

The Hoe or Pick and its functions:

Fig. 58 Stone hoe



Another tool resembling a celt or chisel is a hoe or pick. These cylindrical tools are of two types; in one we find that both the broader surfaces are slightly curvilinear, one convex and other concave; in the other type, one surface is convex and the other is more or less flat (fig 68). However, in both cases their surfaces taper downwards to form a cutting edge which is almost bevelled on the flat or concave side. As their shape more or less resembles a modern semi-pointed or small wide metal pick, they might have been used in a hafted manner whereby the cutting edge was placed transversely on the short handle and the curvilinear

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30 R. K. Pant (*Man and Environment*, Vol. III) has found that it was hafted like an adze to be utilised for wood dressing.

31 H. D. Sankalia, *Pre and Protohistory*, p. 302, divides the wedges from Burzahom into four groups, particularly on the basis of their form at the butt-end, as:

i) broad square butt, hammered, with ground convex medial edge.
ii) round butt, hammered, with tapering sides and convex medial edge.
iii) like (ii) but the section is oval.
iv) round butt and body, sides as well as the edge ground.

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convex surface appears as the exterior face. In this way the hoes might have been used for digging purposes.

Besides, facilitating excavation of post- holes, niches or drains for the residential apartments, they might have even helped in agricultural activity. The hafting of the tool would have made it possible to drag the hoe through the surface soil to prepare the land for the sowing and planting of crops. Used without a haft it could have even helped in the subsequent operations of loosening the earth around the cultivated plants and removing the weeds.

The Ring-stone or Mace-head and its functions:

These stone tools are flat but round or oval in shape and measure on average between 5 and 8 cms. Each tool bears a small perforation or hole made by creating a depression at the centre on both sides by means of a pecking method. The depression was subsequently ground on both sides with a suitable stone to create a perfect hole, the perforation wide on the upper surface and narrow at the centre. Both the faces of the ring stone are finely ground to make a biconvex sharp bevelled cutting edge all along the outer periphery (fig 59). Several uses are attributed to the ring-stones. Some are of the opinion that they were employed for net-sinking during fishing.[32] It is also believed that these were used as weight units for digging sticks.[33]

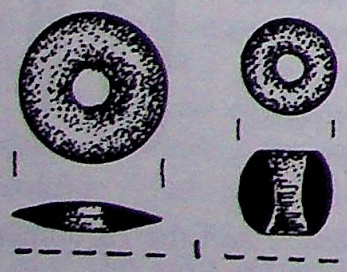

Fig. 59 Mace-heads or Ring stones

These stones, however, seem to have been mace-heads used as an agricultural harvesting tool. Pant, on the basis of his microwear study of these tools, has found

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32 Cf R. K. Pant, *Man and Environment*, Vol. III, p. 16. Pant, however, does not believe so. For net-sinking oblong terracotta objects, having one end pointed and the other grooved, have been recovered from Burzahom, R. P. Sharma, 'Domestic and Miscellaneous objects – Net Sinkers', *An Encyclopedia of Indian Archaeology*, ed. A. Ghosh, Vol. I, New Delhi, 1989, p. 183.

33 H. S. Harrison, 'Discovery, Invention and Diffusion' *A History of Technology*, pp. 59-60.

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such type of 'use marks' on them to reveal that they were hafted through the centre perforation and plugged to hold them tight, whereupon they were used as harvesting tools.[34] In this operation the mace head mounted on a long stick was struck against the standing ripened agricultural crop and its sharp edges ensured the harvesting of the agricultural produce.

The Harvester or Knife and its functions:

It is flat, thin in section, and either rectangular or semi-lunar[35] in shape (Pl. XXIII). One of its long sides along the periphery is bevelled and sharpened to serve as a cutting edge, while its other edge is blunt. There are two or four perfectly bored small holes along the long blunt side (fig 60). Made of both stone and bone, the surfaces of the tool are ground. Sankalia's observation that this object was not an implement but a neck-ornament – a pedant[36]- seems to be far from the truth since no such object with such a sharp edge could be utilised for this purpose. Since the description of the tool resembles a modern butcher's metal knife that is attached with a wooden handle, it is very likely that this novel knife of Kashmir too, when bound with string to a handle, might have been used in the same way. Added to this the hafted knife could have been used as a harvester.

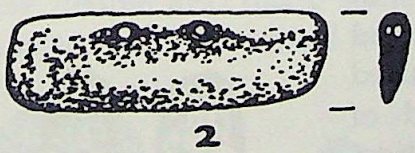

Fig. 60 A stone harvester

Besides these objects we come across several grain processing implements like querns, pounders and grinders, which could be used at

34 R. K. Pant, *Man and Environment*, Vol. III.

35 The harvesters reported from Gofkral are rectangular in shape, *IAR*, 1981-82. Similarly from Burzahom these are said to be rectangular in shape, *IAR*, 1961-62. But there are also semi-lunar types available at Burzahom as published by M. Sharif and B. K. Thapar, 'Food producing communities in Pakistan and Northern India', *History of Civilization of Central Asia*, eds. A. H. Dani and V. M. Masson, Vol. I, UNESCO, 1992, Fig. 4-C, p. 140. This we have carried as Pl. VII.2.

36 H. D. Sankalia, reports that ornaments similar in shape are still being used by some tribes in Kashmir, *Pre and Protohistory*.

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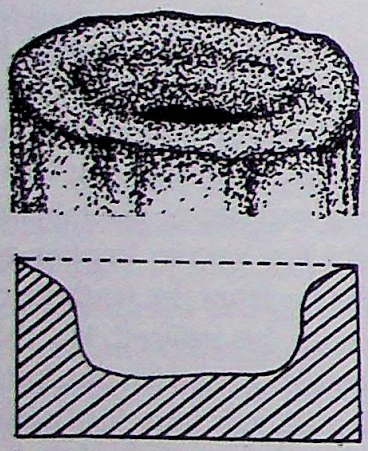
one or other stage of food preparation.

Querns:

The stone querns (fig 61) are made of coarse grained rock and are roughly square or rectangular in shape. Even though the size and shape vary, yet all of them have a symmetrical shaped depression carved out by pecking and subsequent grinding of the centre of stone.

Fig. 61 Stone quern



Pounders and Mullers:

These are similar looking objects made of coarse grained stone, which were often readily available in the form of elongated river pebbles otherwise they had to be ground to achieve the desired shape. Both pounders and mullers are normally large, thick and cylindrical in shape. The difference between them is that the pounders have a flat working surface on one of the elongated sides while the mullers, also known as pestles, on the other hand, have a cylindrical or faceted surface at both the extremities (fig 62). Since these stones have an abrasive working surface and have buttering marks, it seems logical to infer that Neolithic man used them in his food preparations. The querns found at Burzahom with a deep depression of around 22 cms, for instance, must have been used for pounding of grain with the aid of pounders and mullers. Likewise those querns with lesser depression and relatively plain and straight working surfaces must have been used for grinding the grain with the use of grinders the flat surfaces of which were rubbed together to grind the grain.

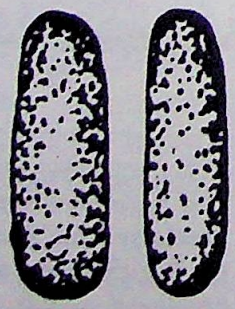


Fig. 62 Stone pestle

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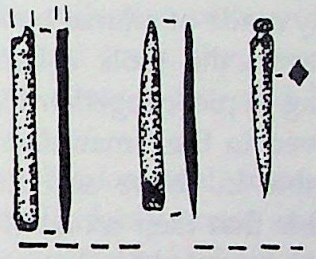
Stone Points:

We also come across a large collection of stone points measuring on average 8 to 10 cms. These are long and cylindrical, triangular or trapezoidal in section with one or both extremities pointed (fig 63). The points show a finely ground surface even on an angular body. Besides these, there are double pointed tools about 15 cm long known as pokers, which have grooves at one end.[37] These could have been multipurpose tools, which were possibly used by the potter to remove excess clay from the pot during pot-building, or to carve graffiti and other designs on the pots. The tools could also have been employed as drill points on bow-strings to bore and drill the eyes of bone needles. They could also have been used for packing the wefts down on a loom during cloth weaving. A point attached to a long wooden shaft could have created a javelin for hunting game. Likewise as a spindle it could have helped in spinning operations.

Fig. 63 Stone points



In addition to these tools there were sling balls, almost spherical in shape (fig 64), which were possibly used as loam weights for the weaving of loam cloths or as net sinkers during the fishing operations. These people also made stone scrapers (fig 64) for various activities connected with the animal food processing.

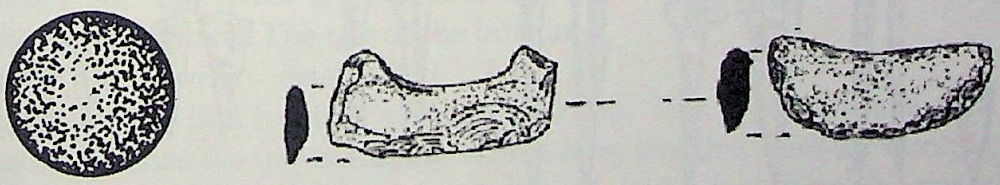


Fig. 64 Stone sling ball and scrapers

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[37] .H.D Sankalia, *Pre and Protohistory.*

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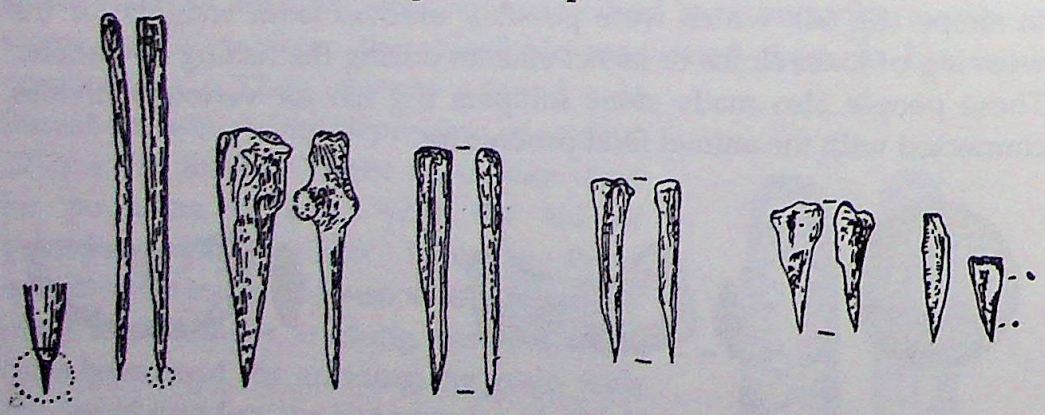
Bone tools:

The largest collection of Neolithic tools recovered in Kashmir is mostly made of animal bones, while a few were produced from antlers. However, the tools collected do not show various stages of their making to piece together the information to speak about the technology involved in their manufacture. Since Kashmir bone tools more or less resemble in shape and form to the tools recovered elsewhere it is possible that their mode of fabrication must have been much the same as that recorded for bone tools in India[38] and elsewhere.[39] The tools were made from long animal bones which were generally split[40] on an anvil to remove the hallow centres and to create splinters of suitable size after parallel grooves were cut deep enough at the required distance. The splinters were subsequently flaked with a chisel to transform them into definite shapes. Thereafter the pieces were rubbed against a coarse stone with a little water so as to produce smoothness and sharpness in them. This is why Kashmir bone tools such as points, arrow heads, awls, needles, harpoons, etc., are very smooth and shining. An idea of their utility can be gauged though the given morphological details.

Fig. 65 Bone points



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38 P. Mehta, *Bone and Ivory Objects in India*, a dissertation submitted to the Department of Archaeology, M.S. University of Baroda, 1972.

39 J. Hawkes, *History of Mankind*, pp. 155-56; L. S. B. Leakey 'Working stone, bone and wood'; *A History of Technology*, pp .140-41

40 Many bone tools like long awls were made of small limb bones without splitting them and as such they retain the bone hollow within their bodies.

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Tool functions:

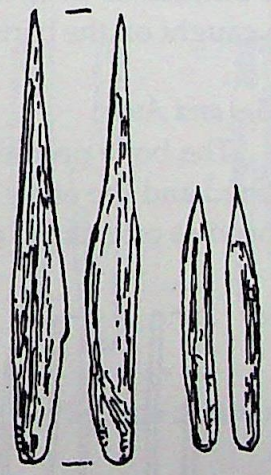
Bone Points:

They were the major component of the collection of bone tools found at Burzahom. Comprising eleven hundred tools, they were of various forms such as pin type, dagger type, spear types, and long, short and medium types.

Broadly speaking, the bone points are circular, oval, triangular or trapezoidal in cross section with one extremity fairly broad and the other pointed (fig 65). Added to these, there are double edged points where both ends are pointed. A large collection of these double edged points are even made of animal horns.

The Arrow–heads:

Fig. 66 Long and tiny arrow-heads



These are small and tiny, and triangular in shape, often flat, having one extremity either shouldered or rounded while the other is pointed and sharp (fig 66). The pointed tip in most of the cases seems to have been charred before final grinding to create extra strength and sharpness. Considering their small size, the tools could not have been used by themselves instead hafted on slim and light wooden shafts to serve as arrows for use with a bow during the hunting of animals. The use of the bow and arrow is well established by its representation in a hunting scene in Kashmir. This depiction on a rock also establishes the use of a spear with a long wooden shaft for hunting wild animals. Some of the bone points such as the long type (the spear type), were probably supplied with a long shaft to be used for the above purpose. In addition to hunting, the bone points might have been employed in the fabrication of other tools, such as making grooves or notches in awls, cutting barbs on the stems of harpoons, piercing eyes in needles, piercing holes in bone harvesters, smoothening of wooden handles for implements and even in buttoning up coats and other

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clothes. Taken together, these tiny bone tools in one way or the other were an alternative to microliths found elsewhere, but not available in Kashmir.

Harpoons:

Made either from flat or cylindrical piece of bone splinters, the tool has a pointed stem or shaft, on one or both longitudinal vertical sides of which are cut small barbs like notches pointing downwards (fig 67). These barbs when present on both sides are placed either opposite each other or are staggered. The tool at the base is slightly grooved or serrated to facilitate its attachment to a haft. Hafted harpoons were efficacious in spearing fish, which would have been caught on the barbs.

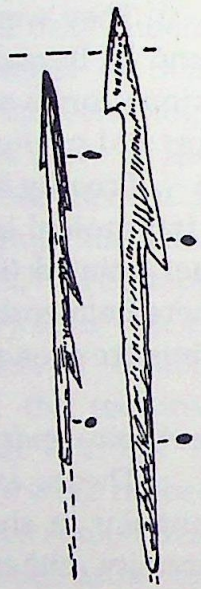

Fig. 67 Bone harpoons

Needles and Awls:

The bone needles appear to be cylindrical with one end slightly flattened and the other tapering into a fine point (fig 68). At the flat end the needles often have a pierced round eye.

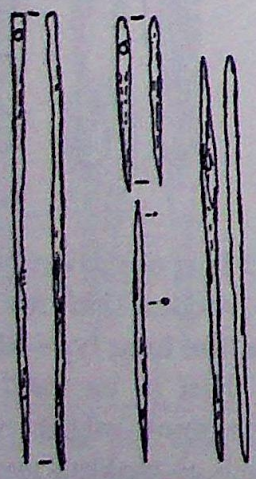

Fig. 68 Bone needles

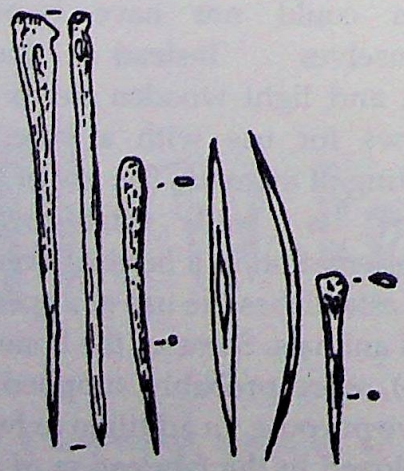

Fig. 69 Bone awls

The awls, on the other hand, are plain and oblong. Usually one end is pointed and the other slightly rounded or flattened (fig 69). The

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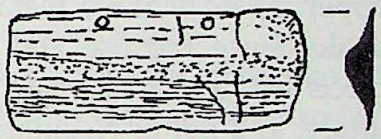
pointed end in many cases is notched or grooved all around. Both these implements as is evident from their form were possibly used in stitching garments and leather articles for which there was ample necessity during the time. Another tool that was possibly used in stitching was a long and hallow bone. It is like a cobbler's poker, having a long point and a long thick round body – to work as a handle in the stitching process of leather goods.[41]

Fig. 70 A bone harvester



There were many other bone-tools used in Kashmir, like a bone harvester (fig 70), borer, polisher, chisel, antler pick (fig 71), and scraper (fig 72), which would have been utilised for a variety of purposes.

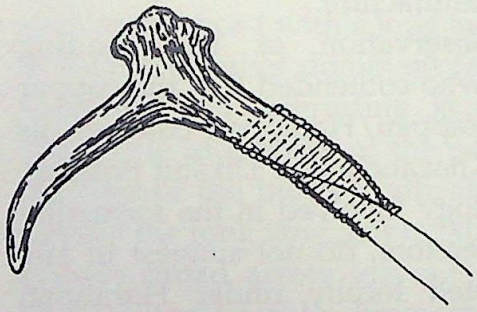


Fig. 71 Antler pick

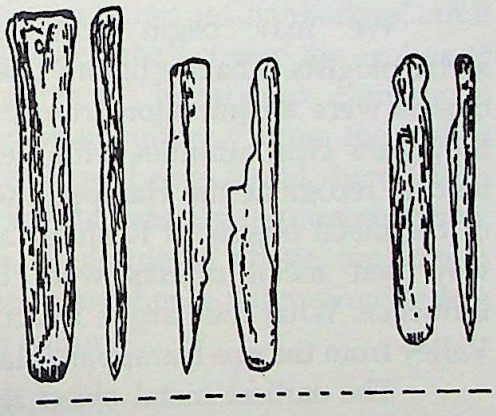


Fig. 72 Bone scrapers

In the tool-kit was also a composite tool in bone which is saw-edged and almost comb-like (fig 73),[42] and might have been used as a comb. Pande believed that it served the purpose of a card,[43] which holds together the warp and the weft during cloth preparation. He further holds that this multipurpose tool might have been even used in

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41 H.D. Sankalia, *Pre and Protohistory*. Along with he describes another tool found at Burzahom called pen-shafted point, it has a groove for hafting

42 B.M. Pande, Toilet object-combs' *An Encyclopedia of Indian Archaeology*, Vol. I. pp.344-45.

43 *Ibid.*

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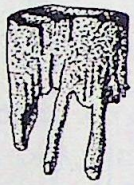
teasing out animal hair for the spinning of textile cords, removing of hair from animals, or for incising decoration on pottery.

Fig. 73 Comb like bone card



Metal objects:

Metal objects such as arrow heads, hair pins, rings, bangles and antimony rods found at Burzahom and Gofkral (Pl. XXIV) are made of copper. Most of these metal objects are brittle and fragile. Since the use and manufacture of copper objects was a characteristic feature of a Chalcolithic culture, and not of Neolithic culture, the pertinent question, therefore, remains as to where these objects came from, who made them, and what processes were involved in their manufacture.

We may begin with the observation of two leading archaeologists, Khazanchi and Dikshit, who contended that the copper objects were an intrusion from pre-Harappan/Harappan cultures, as they show clear affinities with them.[44] Khazanchi and Dikshit possibly tend to recognize the Harappan technology involved in the formation of the metal objects of Kashmir and therefore, do not suggest in any way that metal objects were fabricated locally under Harappan influence. What they argue infact is that they were imported into the Valley from the pre-Harappan/Harappan cultures in that form.

The earliest metal object that were found at Burzahom mostly belonged to the cultural sequence dated to a general time bracket of 2500 -1700 BC,[45] while as the Gofkral objects provide more accurate

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[44] T.N. Khazanchi and K.N. Dikshit, 'The Grey ware Culture of Northern Pakistan, Jammu and Kashmir, and Punjab', *Puratattva*, Vol. 9, 1979, p 49.

[45] Copper objects were first located from the layers belonging to period II at Burzahom, *IAR*, 1964-65, 1971-72, and then continued in the successive periods, *IAR*, 1964-65. However, S. S. Saar, *Archaeology*, p 14, reports that all copper objects were found from a layer belonging to the period I. He seems to have missed the stratigraphical location of these objects as becomes known from the availability of copper objects from different cultural periods at Gofkral, infra note 110. These objects at Burzahom consist of arrow-heads and a coil from period II, a knife from period III and a double edged point from period IV, *IAR* 1964-65; two copper rings and copper needles from period II, *IAR* 1971-72 However, Khazanchi and

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date of their first appearance in and around 2000 -1700 BC[46]. One can therefore infer that at Burzahom also metal objects may have appeared around by this date if the enormous amount of the cultural deposits of the period II were divided like at Gofkral in to two archaeological periods. This date of 2000 – 1700 BC coincides with the latest phases of Harappan civilization, the post Harappan Chalcolithic age. Accordingly one can not establish that these copper objects were procured from the pre Harappan/Harappan cultures, and there are certain noticeable distinctions in the tool typology of the two regions as well.

For example the copper arrows at Burzahom are triangular and leaf-like in shape with pronounced mid-ribs and the narrow arrow leaf has pointed barbs at its lower extremities. Each of these arrows has a long tang and, in one case, the tang has two barbs at the centre. One such arrow head with a long tang has been found at Chanhodaro, but it is devoid of other dominant features which characterize the arrows of Kashmir. Still interesting is the fact that Chanhodaro example is assignable to a phase of the post Harappan culture.[47] From the rest of the sites of the Indus Civilization the arrow heads found there fail to contain the long tang, not to talk of other features. On the contrary, they possess broad arrow leaves,[48] which, as discussed above, are totally uncharacteristic of Kashmir arrow-heads, and hence fail to provide any significant analogues in the Harappan culture.

Dikshit, *Puratattva*, have reported that the arrow heads, bangles and a pin belong to the earliest levels of the period II. They have provided a photograph of these objects wherein there are 7 arrow heads, a ring, a part of a ring bangle and 6 antimony rods/awls/pins, as produced by us in Pl. XXIV.

46 From Gofkral these first appeared in period IC and continued in period II, *IAR*, 1981-82. These include an ornamental hair pin, having flattened coiled head, from the upper levels of the period IC, a copper point from period II, *IAR*, 1981-82, and a copper bangle from period II, A.K. Sharma, *IAS, and ISPQS Conference*, 1982.S

47 V.N. Mishra, `Cultural significance of three copper arrow-heads from Rajasthan', *Journal of Near Eastern Studies*, Vol. 29, No. 24, 1970.

48 *Ibid.*

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The copper pin unearthed at Gofkral[49] is very interesting for having many analogues available outside Kashmir. This thick copper pin has an ornamented head, made by turning round the split ends into two small circles at the top end (Pl. XXIV). Almost similar in general appearance - formed of copper wire which is split and twisted at the top to form two flat spirals side by side - are the double spiral pins, dating around 2000 BC, which have been found at the Harappan sites of Mohanjodaro, Chanhodaro,[50] Banawali,[51] Manda (Pl. XXIV)[52] as well as at the later Bronze age Central Asian sites at Murghab and Anderson.[53] Earlier Stuart Piggot carried out a study of such sites where double spiral headed pins have been located. Besides Mohanjodaro and Chanhodaro in the Indus, he traced seventeen other sites where such pins are available, from Greece to the Indus and the Caucasus to the Persian Gulf.[54] Piggot opines that the double spiral headed pins actually originated in the Aegean and the Anatolian region from where they spread to north Persia and onwards to the Indus around 2500 BC. The retrieval of such copper pins from the Harappan sites of Banawali, Manda, and Mohanjodaro at a later date authenticates Piggott's theory that the pins reached the Indus from the north Persia.

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[49] While speaking of affinities of the copper objects of Kashmir with the pre-Harappan/Harappan objects, Khazanchi and District, *Puratattva*, have only the Burzahom metal objects available, the Gofkral pin was excavated thereafter in 1981.

[50] Stuart Piggot, `Notes on certain Metal Pins and a Mace head in the Harappan culture', *Ancient India*, Vol. 4, 1948, pp. 26-40.

[51] R.S. Bisht, `Structural remains and town planning of Banawali,' *Frontiers of Indus Civilization*, eds. B.B. Lal and S.P. Gupta, New Delhi, 1984, pp. 89-97. His plate No. 59 shows spiral pin belonging to the Harappan period.

[52] J.P. Joshi and Madhu Bhalla, 'Manda- a Harappan site in Jammu and Kashmir', *Harappan Civilization, a Contemporary Perspective*, ed. G.L. Posschl, 1982.

[53] V.M. Masson, `The decline of the Bronze Age Civilization and movements of the tribes', *History of Civilization of Central Asia*, Vol. I, 1992, pp 338, 349.

[54] S. Piggot, *Ancient India*.

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Wherever is the origin of these copper pins[55], their distribution over such a vast area does suggest an outside influence for the origin of the Kashmir pin. Even though there is an analogy in the tool typology and a synchrony of dates, yet the Gofkral pin is not an accurate copy of the double spiral pins found elsewhere. On close comparison of their shape, one discerns a marked difference in them. Whereas all pins found outside Kashmir contain spirals made by winding the coil in that form, the Gofkral pin does not have any such design instead an ornamented head has been made by turning round the splitted ends into two small circles. This, therefore, leads one to suppose that either it was not imported in the form that was available elsewhere or else the metal objects including the copper pin had an indigenous character, and were manufactured in Kashmir.

Indeed, the basic question then arises as to whether the Neolithic people were acquainted with the technique of manufacturing copper objects. Not only in Kashmir but elsewhere also metal objects have been used by Neolithic people.[56] An explanation for the incidence of such Neolithic copper objects is that they were made from naturally occurring native metal, without ever fulfilling the pre-requisite process of smelting - the metallurgical technique adopted by the Chalcolithic people.[57]

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55 In North Persia, many sites have yielded the double spiral headed pins of the date of 2500 B.C. but pins at Sialk date as early as 4th millennium B.C. and still earlier these appear as motifs on the pottery there, S. Piggot, *Ancient India;* because of this says that Sialk may actually have been the place of origin for the double spiral headed pins.

56 The Neolithic Halafian's in West Asia, had small beads of copper, obtained from native copper without implying knowledge of metallurgy, J. Hawkes, *History of Mankind*, p. 229; at Neolithic Sialk were found few pins and little awl, hammered from native copper, *Ibid*, p 230; while as Summerians at al'Ubaid had copper implements as axes and small spear heads during the Neolithic period, *Ibid*, p.232; The south Indian Neolithic sites also had some copper objects in their stock, as at Hallur, *IAR*,1964-65, p. 31; Brahmagiri, *Ancient India*, No. 4, 1947, p. 202, as well as a chisel at Piklihal, F.R. Allchin, 'Picklihal Excavations' *Andhara Pradesh Government Archaeological Series*, No. 1, 1960, p. 106.

57 K.T.M. Hegde, 'Neolithic problem in India', *Indian Prehistory*, Pune, 1964, pp 101-102.

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These technical variations could have been ascertained had the copper objects under discussion been put to a spectrometric and chemical investigation to determine the source and the metal composition as well as to tracing the quantity of impurities. But no such analysis to date has been carried out for the Kashmir copper objects. Added to this limitation is the important problem related to the technique involved in the fabrication of copper objects from copper ore. To overcome such obvious limitations, we need to study the process followed by the Indian Chalcolithic people in the manufacture of the copper objects from copper ore.[58] By this, we may be able to ascertain if the process pursued by the two peoples coincided with each other at any given stage.

Chalcopyrite was the basic copper ore used for the manufacture of copper objects in India. It contains several impurities in the form of arsenic, antimony and sulpher which render the metal brittle. These impurities are however, volatile and are oxidized if the ore is roasted at 500^0-600^0 C on a charcoal fire. Copper itself melts at 1083^0 C. To attain this temperature, it is necessary to smelt the substance in a furnace, an enclosed space where the heat is raised to 1200^0 - 1250^0 C, and the same is retained until the charge inside gets smelted. A higher temperature than that of the melting point of copper renders possible the effective separation of the molten metal from the slag. Since charcoal fire may at the most generate heat up to 700^0 C, the furnace, therefore, entails extraordinary heat for building up the required melting temperature of 1083^0 C and above. For this purpose natural draught or forced draught[59] in a furnace is inevitably required for generating the high temperature necessary for melting the metal and casting copper in a mould so as to attain the desired shape of an object.

But for the copper objects made of native metal it was necessary to heat it up to re-crystallization temperature of 500^0 - 600^0 C and then forged into the desired shape by cold hammering.[60] Such objects of

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58 K.T.M. Hegde, 'Scientific basis and technology of Ancient Indian copper and iron metallurgy', *Indian Journal of History of Science*, Vol. 16, No. 2, 1981. pp 189-201.

59 Where as in forced draught furnace air is blown in by bellows through a tuyere, in a furnace of natural draught air is induced by a high chimney, *Ibid.*

60 K.T.M. Hegde, *Indian Prehistory.*

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native copper could not be made by casting them in moulds as the temperature attained would not allow the melting of the metal. This limited process is attributed to the Neolithic people for the making of their copper objects of native metal. However, the case of metal objects under reference is different; since they seem to have been cast in desired shapes, like those produced by the Chalcolithic people of India. Meaning thereby the people in Kashmir were familiar with metallurgical techniques as the Gofkral pin is a cast article. Likewise the arrow heads exhibit very pronounced midribs which cannot be attained by simple forging technique; instead it is casting technique that makes such prominent high ridges in the centre of arrow leaves.

These metal objects were found to be brittle that occurred to them because of the casting technique. It has been found that ancient metals tend to be fragile as their casting was done in ill-designed or unventilated moulds which did not allow the release of gases[61]. The brittleness of the Kashmir copper objects was, therefore, because of the entrapment of gases in the metal during the course of casting. The recovery of a crucible,[62] a heat resistant container,[63] from Burzahom, supports the argument that smelting of metal in a furnace was practised by the people.

A pottery kiln, like the one found at Gofkral,[64] could serve the purpose of a furnace, as was done by the Harappans who had a pottery

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61 K.T.M. Hegde, *Indian Journal of History of Science*. Both the casting techniques, the ill-ventilated and the ventilated techniques, were known to the Harappans and both were employed by them for the fabrication of their articles, *Ibid*.

62 *IAR*, 1966-67.

63 H.C. Bhardwaj, 'Technology – crucibles', *An Encyclopedia of Indian Archaeology*, p. 320.

64 A.K. Sharma, *IAS and ISPQS*. 1982.

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kiln with a chimney[65] as a substitute for a furnace, in which were used crucibles[66] for smelting purposes.

What the above account shows is that these copper objects were not imports but locally manufactured from processed copper ore available at many places in Kashmir.[67] The adoption of this Chalcolithic characteristic does not seem to have changed the prehistoric character of this culture. It is in spite of the fact that the techniques adopted, however, were that of the Harappans who had by then attained a certain proficiency in metallurgy. For acquiring such a skill they necessarily required to build some kind of contact with them for which evidence has been found in Kashmir.[68]

Ornaments:

One such evidence is in the form of about 1400 carnelian and agate beads found at Burzahom. These beads are believed to have been acquired from the Indus people given their resemblance in shape to the beads of that culture.[69] This is also because the carnelian used in the manufacture of beads was not available locally. In addition at Burzahom were found 26 beads in gold as well as many more were

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65 K.T.M. Hedge, *Indian Journal of History of Science* argues that Harappans like iron culture people might have used the forced draught furnace for which however, no contemporary archaeological evidence was available. But he has produced a figure of pottery kiln from Mohanjodaro, as a furnace for the purpose having a chimney for air, in fig. No. 52 in his latest article, K.T.M. Hedge, 'Technology Furnaces', *An Encyclopedia of Indian Archaeology*, p. 322.

66 H.C. Bhardwaj reports these from the Harappan context at Lothal and other from Chalcolithic sites of Ahar and Inamgoan, *Encyclopedia of Indian Archaeology*, p. 326.

67 Copper ore like chalcopyrite, bronite, chalcocite, malachite and azurite is reported from many localities in Kashmir; e.g. in the Sindh valley (Kangan, Ganderbal being important), Shamuhal near Aishmuqam in Anantnag and Lashteel area in Kupwara; *Gazetteer of India, Jammu & Kashmir State, Kashmir Region*, ed. Dr. Bashir Ahmad, Vol. I, Srinagar, 1999, p. 31.

68 The evidence pertains to a find of a Kot-Dijian type black painted pot depicting a bucranian head, T.N. Khazanchi and K.N. Dikshit, *Puratattva*, as well as similar type of other Harappan traits like the existence of carnelian and agate beads at Burzahom; see also last Chapter for such contacts.

69 R.K. Pant, *IAS and ISPQS*, 1981.

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found of paste, steatite, bone and wood.[70] Given the availability of bone, wood, paste, etc. the Neolithic people were, therefore, better placed to manufacture these beads rather than those made of cornelian. As was found from a grave at Burzahom these beads were used by the people for making ornaments like necklaces to ornate themselves. Some of them had even the privilege to use copper bangles while many others used terracotta bangles as ornaments (Pl. XXI).

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70 At Burzahom 950 carnelian and agate beads are reported as a hoard contained in a terracotta wheal made red ware pot, from the layers of period II, *IAR*, 1964-65. In addition, over 400 carnelian and agate beads and pendants (period not mentioned), and 26 beads, possibly of gold, were found from Burzahom period III, *IAR* 1971-72. Besides, five carnelian beads were recovered from the neck region of a burial of period II, one soap stone circular bead and one small barrel shaped paste bead were found from graves of two burials of period II, A. Basu and A. Pal, *Human Remains from Burzahom*, Calcutta, 1980, p. 14. The beads from Gofkral are: one cylindrical and one barrel shaped steatite bead from period IA, one wooden bead from period II, a terracotta bangle from period IC, *IAR*, 1981-82; two semi precious beads one of which is of carnelian from period IB and a canine shaped pendent from period II, A.K. Sharma, *IAS and ISPQS*, 1982.

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Chapter VI

THE NEOLITHIC ECONOMY

Investigations have shown that during the 2000 years of their existence the Neolithic people lived far and wide in Kashmir. We also know that they created a wide variety of material culture to live reasonably well and pursued multifaceted activities like dressing and cutting wood, digging house foundations, constructing apartments, cattle pens, storage places, making kilns and pottery, producing tools for hunting and fishing, for agricultural operations and food processing as well as for textile weaving and tailoring. For all these diverse activities it was essential that they have a regular and dependable supply of resources to live on.

Even though prehistoric man was in essence a food-gatherer yet in the Neolithic times he became universally conversant with the art of farming to adopt it as a permanent means of livelihood. By and large this was the case with Kashmir also in spite of the fact that he did not altogether disengage himself from the age-old mode of production i.e. hunting, in particular during the early days of the culture. With the growth and development of the culture he completely transformed himself from a food-gatherer to a well-settled farmer as is reflected from the remains of farming implements and food processing equipments together with the evidence of seeds of many types of domesticated food plants and of bones of the farm animals found from the excavated sites of Burzahom and Gofkral.

Field Agriculture:

The archaeobotanical investigations carried out on plant remains collected from the various cultural phases at Burzahom and Gofkral show that there was a marked similarity in the cultivated varieties of food plants at the two places. It in other words means that this society at all the village sites across the Valley would have pursued field

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agriculture alikely with a homogeneous cropping pattern. What the record of the two sites besides suggests is that at both the places people started their mode of farming production with advanced types of agricultural seeds. Whether the people of the pre-Neolithic times were conducting any sort of such agricultural operations based on these cereal seeds is not known yet indications are that some kind of grain based economy was available then with whatever type of seeds, wild or cultivable, as they utilised many types of stone tools for the processing of grain foods. A clear picture regarding the agricultural operations is only projected by the record available from the two sites and the remains of the food plants collected from the different cultural periods provide the following picture[1].

Plant Food:

During the earliest period at Burzahom between 3000-2500 BC cereals, pulses and horticultural products together constituted 86% of plant economy while there were also 14% of weeds. Of the food plants cereals alone constituted 73.68%; of which wheat (*Triticum aestivum* and *Triticum sphaerococcum*) was the major crop with a share of 78.5% and the rest of 21.5% was barley (*Hordeum vulgare*). The share of pulses in the total agriculture was 1.7% made up by lentil (*Lens culinaris*) and that of the fruits 10.5%. This cropping pattern almost continued during the next cultural phase (2500-1700 BC). There was noticeable change in the pattern during the final stage (1700-1000 BC) when new entrants in the food menu, like rice (*Oryza sativa*) and pea (*Pisum sativum*), were

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[1] The information is based on the researches conducted on the material retrieved at Burzahom by G. M. Buth and R. N. Kaw, 'Plant husbandry in Neolithic Burzahom, Kashmir', *Climate and Geology of Kashmir and Central Asia, The last 4 million years*, New Delhi, 1985, pp. 109-13; Farooq A. Lone, Maqsooda Khan and G. M. Buth, *Palaeoethnobotany, Plants and Ancient Man in Kashmir*, New Delhi, 1993, pp. 204-207; Gofkral plants were studied by M. D. Kajale of Decan College, Pune and are reported in *Indian Archaeology – A Review (IAR)*, 1981-82, pp. 19-25; wherein the rice and millet were said to have been introduced in 1700-1000 BC (period II), but subsequently both these cereals were reported to have got introduced in 2000-1700BC (period IC), A. K. Sharma, 'Excavations at Gofkral – 1981', *Puratattva*, No. 11 (1979-80), 1982; A. K. Sharma, 'Excavations at Gofkral-1982', *IAS and ISPQS Conference*, November 25-27, New Delhi, 1982.

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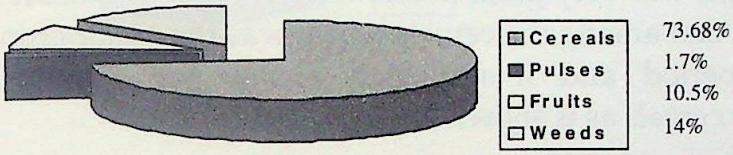
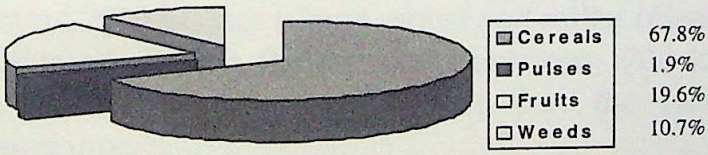
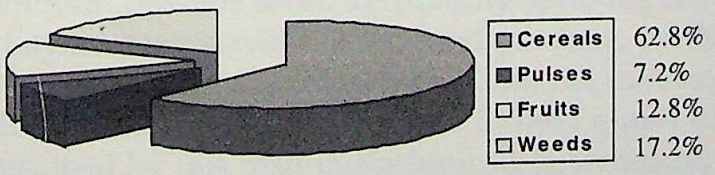
introduced. The associated weeds were *Medicago* spp., *Vicia* spp., *Galium aparine, Galium tricorne, Astragalus* spp., *Melilotous albus, Lithospermum arvense* and *Ipomoea* spp. The following figure (Fig 74) demonstrates this pattern in a simplified way.



a) 3000-2500 BC



b) 2500-1700 BC



c) 1700-1000 BC

Fig. 74 Constituents of food during the Neolithic period

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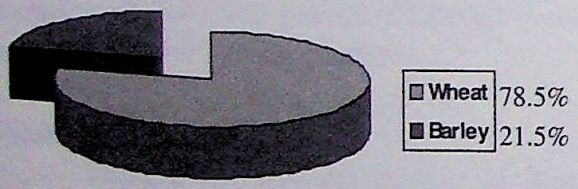
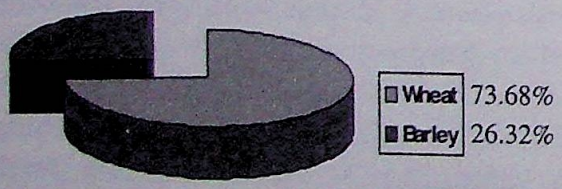
All this information amply demonstrates that the agricultural operations allowed the people to get very high ratios of consumable food as compared to weeds. This data also shows that as compared to the share of fruits and pulses in the over all share of foods consumed the percentage of cereals was very great in all the three cultural phases. It has also been found that among the cereals wheat was the major crop grown during the period and it remained always an essential constituent among the cereals as is shown in the figure, Fig 75.



a) 3000-2500 BC



b) 2500-1700 BC

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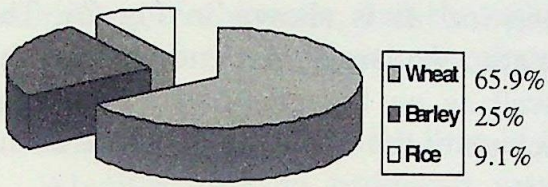

c) 1700-1000 BC

Fig. 75 Share of the cereal foods during the Neolithic period

Almost a similar situation is found at Gofkral too where around 3000-2500 BC wheat (*Triticum aestivum*), barley (*Hordeum vulgare*) and lentil (*Lens culinaris esculanta*) crops were grown. Besides, around 2500-2000 BC common pea (*Pisum arvense* Linn.) was introduced while around 2000 BC rice (*Oryza sativa*) and millet (*Elevisine corona*) were also cultivated. During the last stage between 1700-1000 BC all the earlier types of the crops were grown but the rice was cultivated in abundance.

The cultivation of cereals and pulses by and large marked the culmination of human efforts put in different stages of the economic history of the period. To be more exact, these crops entailed definite human labour to a varying degree while as there were certain horticulture products, which necessitated human activity to a minimum possible level. Technically speaking horticultural produce is not synonymous with agricultural produce, as the fruit crop is not a part of agricultural economy and does not necessarily suggest orchard culture, but fruits of many kinds formed a part of the articles of food consumed by this man in Kashmir. It is, therefore, a fact that the share of horticulture has been calculated in the over all agricultural economy.

In the over all consumption of horticulture crop of 10.5% between 3000-2500 BC peach (*Prunus persica*) constituted 33.3%, apricot (*Prunus armeniaca*) 16.6%, and walnut (*Juglans regia*) 50%. During the following period between 2500-1700 BC almond (*Prunus amygdalus*)

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was the new addition and finally between 1700-1000 BC the new addition was cherry (*Prunus domestica)* as is shown in Fig 76. The variation in their percentages that are seen largely depended upon the share of their consumption as well as on the share of agricultural produce at a given time as also because of the entry of new types in the fruit economy.

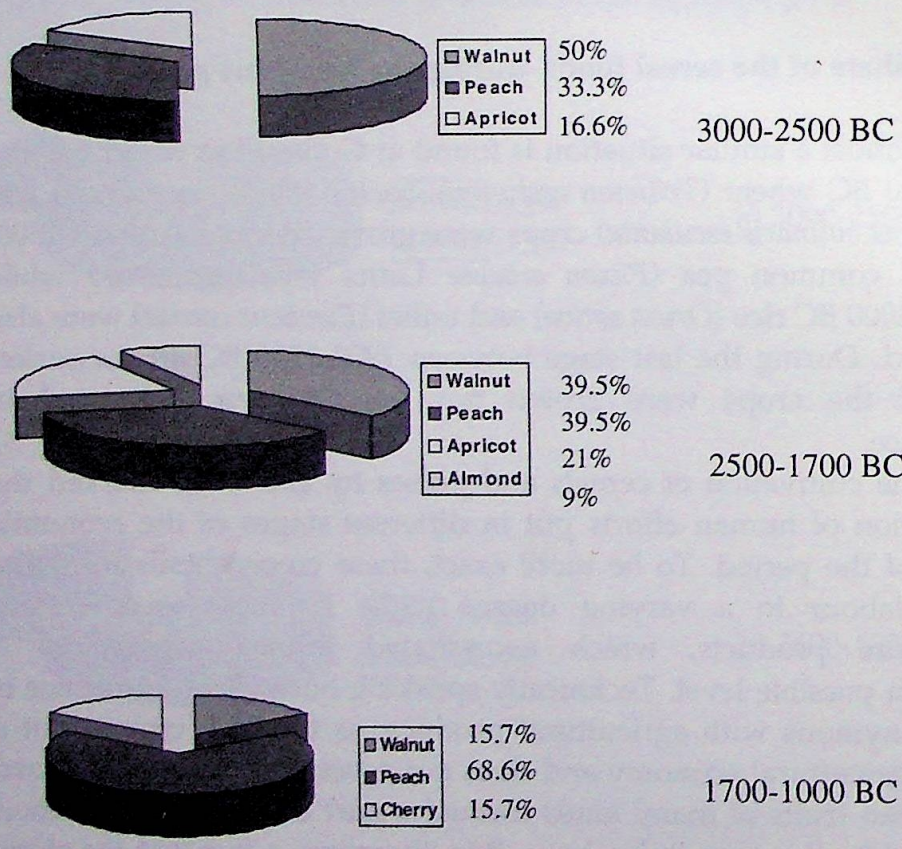

Fig. 76 Horticultural products used as supplement to food

Production of plant food:

The archaeological evidence sufficiently proves that the man in Kashmir had an access to many types of food plants, and that too of

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advanced types, which were utilised for sustenance and economic growth. The question remains if this society, which in essence was prehistoric in character, had the capacity to sustain alone on the field agriculture, for its economic development. Obviously the two essential questions would be:

- How the farming commodities of food were produced? ; And
- Whether food so produced was sufficient enough to meet the sustenance requirements of the people?

Favourable environmental conditions, ability to posses or develop skill necessary for farming activities, adoption to the settled pattern of living, besides the availability of various types of seeds of wild plants in the Valley that were suitable for the mutation or the growth of domesticated varieties or otherwise acquisition of seeds of the domesticated plants were the prerequisite factors to transform him from a food-gatherer to a settled farmer in Kashmir. Settled life and production of large equipment necessary for farming activities would make it rather easy to adopt and develop a permanent source of food economy once man was in the possession of seeds of domesticated plants for their cultivation. Even if it is assumed that this man in Kashmir may have not laid his hands on those locally available seeds that could had gone through the mutational changes for their domestication yet he lived at a time when in his neighbourhood many people had picked up farming as the main source of economy to introduce their plant seeds for their cultivation in and around his settlements.

Studies carried on the palaeoenvironment and palaeoecology of Kashmir have shown that the environment of the period was, by and large, as good as exists now[2]. Today all the cultivars like wheat, rice,

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2 Rekha Dodia, D.P.Agrawal and A. B. Vora, "New Pollen data from the Kashmir Bogs: A summary', *The Evolution of the East Asian Environment*, ed. R. D. Whyte, Vol. 2, Hong Kong, 1984, pp. 569-78; Farooq A. Lone, Maqsooda Khan and G. M. Buth, 'Five Thousand Years of Vegetational Changes in Kashmir: The Impact of Biotic Factor', *Palaeoclimate and Palaeoenvironmental Changes in Asia: The Last 4 Million Years*, New Delhi, 1988, pp. 165-68; D. P. Agrawal, *Man and Environment in India Through The Ages*, New Delhi, 1992.

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barley, pulses, etc are grown in the Valley, to point out the fact that the cultivation of these food plants during the period would not have got hampered on account of any of such natural conditions. While the evidence of plant foods provides a clear picture of the development of agriculture in Kashmir, these together with the processing tools like pounders, querns and mullers, also point to the fact that the retrieved plant products were utilized for the food consumption. The availability of agricultural implements like digging and harvesting tools together with farming plant products do testify to the coexistence of relationship between man and plants essentially rooted in arable land. Such a relationship would have neither existed nor developed unless there was someone to explore it first and subsequently exploit it for a given required purpose. In other words, these people managed the tools and the seeds for the sake of growing different kinds of cultivable crops.

The entire agricultural process required the preparation of the soil, sowing of the seeds, cultivation of the crops, protection of the farms, harvesting of the crops and their subsequent appropriation for the sake of sustenance of the farmer and his family. This farmer was producing a variety of crops which for their distinct nature and specific soil could be broadly classified into winter crops or rabi and summer crops or kharif. Both of these types require peculiar conditions to grow and develop as both are grown either in cold or moderate warm conditions supplemented by occasional rainfall in some cases or abundant water in others. Notwithstanding these diversifications, in the beginning of the culture only the single cropping method was pursued as only the rabi crop cultivation of wheat, barley and lentil was evident. This farmer seems to have learnt double cropping pattern as late as 2000 BC when rice as the major kharif crop was grown. This kharif crop, which is the most cultivated cereal of the Valley today, needs plenty of water, and moderate summer warmth to grow. Nevertheless the growing of the rabi and kharif crops indeed allowed him to adopt a mixed cropping pattern to provide the food supplies both for the summer and winter months. Both these could be grown on the land available around the settlement area he lived in.

No evidence is available as could suggest that the arable land of the farmer was located within the village extent, which was located

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invariably on the karewa top, higher than the fields below. Like the site of Gofkral situated at a height of about 35 meters from the fields below[3] procurement of water for irrigation at such heights must have been a stupendous task for a man not conversant with modern techniques of irrigation. This is in spite of the fact that their rabi crops would have required very little water for irrigation. The advantage this man had, however, was in the natural descending landscape of the Valley, where water source, located at a higher level in the form of a mountain stream, was readily available for the irrigation of fields, far and wide, without it being channelled, as the landscape allows a natural gravitational irrigation mechanism.

The presence of such water sources below the village extents would, therefore, suggest that the cultivable land of this farmer was situated on the plain land down the mound, as has been found at Turkepur[4]. The added advantage for this man was that for about first one thousand years of agricultural activity most of the crops, like wheat, barley, masur and pea- all winter crops, required very little quantity of irrigation for their growth and development. The present experience shows that these crops do fairly well in the Valley on winter precipitation alone and even in the absence of proper irrigation system. The winter precipitation comprising abundant snowfall and incessant rains also minimize the quantum of required input labour for digging the agricultural fields.

The situation for the first farmers would not have been different even though their digging equipment was primarily primitive. In the entire process of digging, the soil was to be dug with the help of several digging tools which as a matter of coincidence had a multipurpose

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[3] *IAR*, 1981-82, p. 19. Almost all the Neolithic sites in Kashmir are located on high lands and are surrounded by rice fields located at lower levels drawing their irrigation on the principle of gravity.

[4] While more than one meter of earth was removed from an agricultural field at Turkepur, in district Baramulla, on Sopore-Bandipur road along the Wular Lake, two celts were found. These are respectively 40 and 50 cms long, pecked and ground having unifacially bevelled cutting edge, *IAR*, 1984-85. Above the agricultural field on the raised ground are found remains of the Neolithic period including some food processing tools.

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utility. The farmers were, therefore, required to break up the soil, that was loess which as a matter of fact is rather loose soil, with the tools at their command like hoes, celts, picks and wooden digging sticks mounted with mace heads. At some stage of their culture, it seems ploughing also became known to them, as the presence of stone plough at Turkepur would suggest[5]. The digging process would have thus become still easier as there was no dearth of animals required for driving it (see the sequel). All these operations would have rendered it possible to sow seeds soon after sods were turned over, without any further strenuous labour. The seeds thus buried in the soil would germinate on account of winter precipitations or irrigation.

As for the cultivation of rice, the present experience shows that for the growth and development of the crop continuous stay of water in the fields is necessary for a long duration of time, irrigation was as such inevitable. In this context, the geographical setting of their fields as well as the advantage of gravitational irrigation mechanism was ideally suited for the fields to get irrigated adequately. To cultivate rice, besides this essential requirement, fields were to be sufficiently prepared and opened up deep, as now, by hoeing and ploughing before and after irrigating them. For such a preparation the farmer had only stone hoes and ploughs that would open up the land but not as effectively as the iron implements do. For that reason, low lands were to be preferred, near lake shores or marshy lands that, as now, remain water logged for a considerable period of time annually. Such fields when hoed followed by puddling get sufficiently prepared and the farmers accomplish this, as now, by splashing around with bare feet. In

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[5] Because of their extraordinary size and their presence in agricultural field, the Turkepur celts seem to have been fabricated exclusively for digging in the agricultural fields possibly as agricultural ploughshare. A similar shaped long tool, 30 centimeters in length, was recently located from a Neolithic site at Somber, (now in the possession of Dr. G. M. Bhat, of Deptt. of Geology, University of Jammu). In Western Europe long bars of flint, about 25 cms in length, found from the Neolithic sites have worked as part of plough, M. C. Burkit, *Our Early Ancestors*, Cambridge, 1926,. p.55. The earliest archaeological detection of cattle drawn ploughing in the sub-continent has come from the pre-Harappan levels at Kalibangan in Rajasthan, Bridget and Raymond Allchin, *The Rise of Civilizations in India and Pakistan*, New Delhi, 1983, pl. 6.30, p.161.

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such a case they do without transplanting young rice saplings from nursery beds to rice fields[6] for which the soil need to be extra soft. In the puddled–flooded fields, rice seeds were to be simply broadcast for the direct cultivation of rice plants to involve less labour input, as is being done at present in the Valley on the marshy lands.

The evidence available is that villages like Burzahom and Gofkral remained inhabited continuously for about two thousand years, generation after generation, without any break. As the case was, the villagers required for their sustenance a brisk agricultural activity. Soil exhaustion of the fields, therefore, was inevitable particularly once their crop fields were in constant use for the production of agricultural foods. The pollen record from the sediments of the Anchar Lake, in Srinagar, has shown that during the period there was a great agricultural activity with cultivation of adequate cerealia type vegetation in the Valley[7]. The long-continued activity was only possible if the agricultural fields had sufficient potential to raise the crops. Whatever the nature of soil, they require some dose of fertilizers for enrichment before and after sowing. To enrich the constantly used crop fields the farmer having rarered a variety of domesticated animals would have used their dung as manure once he knew its qualities. Floods, on the other hand, renew the alluvial lands and the fields of the villages located near the major streams would have got benefited as fresh salts work as nourishing agents in the flood renewed soils. On the other hand fields situated away from the alluvial plains the benefits of the flood renewed soils were minimum and low. However, in their

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6 Transplantation in rice cultivation contributes much to the increase in yield, and lack of this process is possibly the reason that rice cultivation percentage was found very low as compared to wheat and barley, which remained the principal crops then. However, this ratio changed in the post-Neolithic periods, possibly because of transplantation of rice saplings, as is evident from Semthan finds where around 1000 BC rice constituted 55.8% wheat 30.8% and barley 14.4% of total crops, even though this ratio in favour of rice does not remain constant subsequently, yet it finally became the major crop of Kashmir, Farooq A. Lone, *et al*, *Palaeoethnobotany*, pp. 207-12.

7 Rekha Dodia, D. P. Agrawal and A. B. Vora, 'New Pollen data from the Kashmir Bog', *The Evolution of the East Asian Environment*, ed. R. D. Whyte, Vol. 2, 1984, pp. 569-78.

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crop lands pea, pulses and clovers[8] were also growing. Such legumes are well known for their utility in fixing nitrogen (from atmosphere) in the soil which in turn supplements fertility of land under cultivation and reduces the possibility of soil exhaustion. The legume cultivation may have also impressed upon him to adopt rotation of crops in order to maintain soil fertility and reduce the possibility of soil exhaustion.

Besides, given the abundance of land around their habitations, there was even possibility of desertions of the exhausted crop fields and, as a substitute the man must have claimed the forest land though this should not have been the only consideration for this act. The palynological studies carried out by Vishnu Mittre at Haigam Lake in the Valley have revealed that Kashmir forests were cleared for agricultural purposes around 2000 BC, causing thereby decline of pine forests, followed by appearance of *Plantago lancelate*, rise in *chenopodiaceae* and composite shrubs.[9] While all these developments were due to the promotion and speeding up of the ongoing agricultural activity of herbaceous plant growth, they were simultaneously bound to stimulate a reasonable balance in the land-man ratio which on account of population explosion must otherwise have got imbalanced[10]. In fact Gorden Childe has maintained that because of development of agricultural activity the Neolithic period experienced rapid rise in population world over.[11]

Even otherwise one is within one's right to suppose logically that the need to clear forests for the sake of agricultural development would not have been usually felt unless forced by the necessity of growing population. Nevertheless, the reclamation of various types of

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8 Clover is a legume weed plant and was reported along with cereals from Gofkral, A. K. Sharma, *IAS and ISPQS*, 1982.

9 Vishnu Mittre, 'Palaeobotanical evidence in India'. *Evolutionary Studies in World Crops, Diversity and Change in the Indian subcontinent*, Cambridge, 1974, pp. 3-30.

10 Taking material equipment as a parameter to measure the growth in population, it is found that as compared to the period between 3000-2500 BC the tool number grew three times during the subsequent period of 2500-1700 BC at Burzahom, evidently thus during the middle stages of the culture the population increased at more or less the same rate.

11 Gorden Childe, Social Evolution, London, 1951, p. 22.

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cereal seeds from all the cultural phases at Burzahom and Gofkral do attest to the active agricultural activity during the period. Together with this, weed types, as found at the excavated sites, along with cereal types, are of great significance to the agricultural development. Besides playing important role in plant mutation and domestication, as in wheat, they are also indicative of high agricultural activity.[12]

Whatever the qualities of weed plants in the development and progress of agriculture, they grow at the cost of food plants in the fields, and impair and retard the agricultural yield. These farmers seem to have been ignorant of the weed plants as a deterrent to the yield of food plants, and because of this they did not separate the weeds from the food plants in the agricultural fields. The retrieval of many types of weed remains along with the crop products at these sites suggest that the weeds were harvested along with but one does not know if these were separated out during the processing of the food. In any case, the farmers seem to have compromised with the otherwise negative effects of weeds on the crop yield, of which we have no direct estimation.

Yield of the crops:

To estimate the crop yield per unit of land it is imperative to determine the conditions responsible for the productivity. On this account there is limited evidence to know what must have been the exact situation prevailing then in Kashmir or what was the salt composition of the soil under cultivation, or how much a unit of land was capable to produce, etc. However we certainly know that the prevailing environmental conditions were good enough for the growth and development of the agriculture, as these exist now. In addition, the geophysical situation of the Valley has not changed to any appreciable extent during the past five thousand years to alter the natural gravitational drainage channelling mechanism. One can not but rule out that during the past five thousand years there would not have occurred change in the salt composition of the soils, their deterioration and enrichment on account of various natural and man made factors. In view of such limitations reasonable estimates have been prepared to

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[12] Farooq A. Lone, *et al*, *Palaeoethnobotany*, pp. 149-51.

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arrive on figures in the West Asia. Making it a model we understand the yield of the cereal crops during the period in Kashmir could also be logically and plausibly estimated.

Crop yield per unit of land at around 2400 BC in Southern Mesopotamia has been calculated on the basis of equipment, the type of seed grains available, and the nature and salt composition of cultivable land. Accordingly it was found that each acre of irrigated land yielded then 575 kgs of barley and 525 kgs of bread wheat.[13] Similarly scholars were able to estimate that in an acre of cultivated land about 360 kgs of millet[14] -being the only major crop that was produced during the Neolithic Yang Shao times in China. Since the Kashmir farmer used agricultural implements and raised the seed types of wheat and barley very much similar to those of the West Asia one can assume that the crop yield per acre of land too may have been nearer to that of West Asia. Reasonably the average yield per acre of the agricultural land in Kashmir can also be said to have been around 550 kgs of wheat or barley per annum. This quantum of the yield was nevertheless subject to change depending on the conditions related to bumper crops or serious crop failure.

Requirement of the plant food:

Considering 550 kgs of the cereal crop yield per acre of land nearer to the actual crop yield, the question arises: was the quantum of food produced sufficient enough to feed on average a family of say seven members of a farmer[15] working in the fields during the times? It was found that during the Yang Shao Neolithic period in China an adult male was able to cultivate in a year 4.4 acres of land all alone

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[13] Thorkild Jacobson and Robert M. Adams, 'Salt and Silt in Ancient Mesopotamian Agriculture', *Science*, Vol. CXXVIII, No. 3334, Nov. 1958, pp. 1251-58. The two Chicago University scholars estimated the yield of these cereals in US bushels measurements of volume and since one US bushel weighs about 48 pounds of barley and about 60 pounds of bread wheat it makes thereby about 1440 pounds of barley and 1309 pounds of bread wheat and since one pound is equal to 400 grams, the measurement of these food items is thus arrived at.

[14] Ping -Ti Ho, *The Cradle of the East*, Chicago, 1973, pp. 85-86.

[15] The family and size of the family are described in the infra chapter

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effectively,[16] with the help of tools that were of stone as in Kashmir. Like in China, the farmer in Kashmir was working on the soft type of loess soil for the preparation of the fields, he too may have been more or less able to produce 2420 kgs of wheat or barley per annum from a maximum of 4.4 acres of land (550 kg x 4.4 acres =2420 kg) he was capable to cultivate all alone and without the help of his family. Taking into account the quantum of energy consumed in the process of work the daily food requirement for proper sustenance of an adult working male farmer is 2300 calories. One kg of most of the cereals like wheat or barley produces 3,350 calories[17]. While reconciling the human requirement with the quantum of his energy consumed in the process of work, the large number of calories thus produced by his cereal production was comparatively adequate enough for his family members annually. Actually such an individual living exclusively on cereal food would require 700 grams of grains per day to produce the required energy of 2300 calories, and thus was to consume about 255 kgs of such a cereal per annum. As per the above calculations, one acre of land will support 2.1 individuals on wheat or barley– a figure that more or less coincides with the one worked out for the Harappans,

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16 Ping-Ti Ho, *The Cradle of the East*, p. 84.

17 Kent V. Flannery, 'Origins and ecological effects of early domestication in Iran and the Near East', *The Domestication and Exploitation of Plants and Animals*, eds. Peter J. Ucko and G. M. Dimbley, London, 1969, pp. 73-100, table 3; he has given estimated values of some of foods commonly eaten in Iran which was compiled on the basis of research of B. S. Platt, *Medical Research Council, Special Report Series*, 1962, p. 302. For those of the food sources found in the Neolithic Kashmir, the estimated values per kg of edible portion are:

Food	Calories	Protein Gms	Fat gms	Carbohydrates Gms	Calcium mg	Iron mg
Wheat	3440	115	20	700	300	35
Barley	3390	120	20	680	350	40
Lentil	3390	240	10	590	700	70
Almond	6570	200	590	120	1500	35
Goat	1450	160	90	-	110	25
Sheep	1490	170	90	-	110	25
Cattle	2020	190	140	-	100	30
Pig	3710	140	350	-	100	20
Fish	950	180	25	-	500	10

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where the produce of one acre fed about 1.86 individuals annually[18] on wheat and barley. Nevertheless the above estimation of Harappa will precisely correspond to those of Kashmir if 15% weed production that grew along with the plant food is deducted from the total crop production per acre of land in Kashmir.

Be it as may be, on an average two persons in Kashmir were able to live on the wheat or barley produce of one acre. The produce of about 2420 kgs from 4.4 acres of land that this farmer was able to cultivate was sufficient enough for his family of seven. The six other members of such a peasant were thus beneficiary and he was able to retain some surplus with him (consumption, 255 x 7 = 1885 kgs; yield 2420 kg – consumption 1885 kg = surplus 535 kg).

This observation would have been reinforced had the remains of agricultural products been located in heaps stored at one or the other place. Unfortunately, we do not have direct evidence of such a surplus, or techniques of crop storage including a surplus. What one can infer is that once the pottery articles were manufactured these might have been used for the storage of food grains since some of them were certainly of large size with very thick walls[19]. During the Aceramic period, most certainly, the storage pits, as described earlier, might have served this purpose. For the sake of effective preservation, these storage places had a provision for roof cover as well as being lined internally with a coat of plaster – a mechanism which differed from the Egyptians who used a basket lining for their storage pits.[20]

Processing of the food:

Whatever the quantity of agricultural produce, it had to be stored but not before the crop was processed first. The processing techniques of these people were non-mechanized, and by and large

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[18] Walter A. Fairservis, Jr. *The Origin, Character and Decline of an Early Civilization*, American Museum Novitiates, No. 2302, Oct. 1967, p. 35.

[19] A large thick gritty red piece of a large sized storage jar was recently collected from a section of an excavated trench at Burzahom besides some were collected from few Neolithic sites in Sopore. Such large sized jars were used in Kashmir till very recently for the storage of grains.

[20] J. Hawkes, *History of Mankind*, p. 285, 310.

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they were the same as exist now. After harvesting[21] the pods of the lentils or pulses needed to be dried before extracting the grains by human hand, but if the quantity was very large, the grains were released from the pods by trampling with the hooves of animals driven on the dry heaps. Similarly, the cereal crops after their harvest and subsequent drying in sunlight, were to be threshed for their grain, as all cereal crops in Kashmir were threshing crops (infra pages, this chapter). Threshing was probably done as now, by striking a bunch of cereal plants against a wooden log which in process led to the collection of grains on the floor, containing chaff and straw pieces as well.

The non-food particles would get separated by winnowing, whereby the grains along with non-food particles contained in a small basket are allowed to drop from a height, to remove the light weight chaff and straw carried aside by the breeze and heavy grains fall down. It is significant to point out here that these people were conversant with the art of basket making which besides other uses might have been utilised for this purpose also. After the net product was collected, it was processed in every house for the preparation of food by pounding in querns and grinding with grinders which were found in large numbers during the excavations at Burzahom.

History and origin of the crops:

Having this background in mind, it is in the fitness of the things to deal with the history of each crop separately so that we understand what were the possible sources for the genesis of agriculture in Kashmir.

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[21] As there was no blade industry available, it becomes rather difficult to envisage what formed the harvesting tool. The tool that is regarded to have served effectively for the purpose is known as harvester, available in stone as well as bone, but not from the very beginning of the culture and appears only towards the middle stages, Table I and II, supra Chapter V; on the other hand mace-heads mounted on wooden sticks have been found to have served the purpose during harvesting, supra Chapter V. Recently at Somber Dr. G. M. Bhat of Deptt. of Geology, University of Jammu has found a sickle shaped stone knife. This Neolithic tool has a very sharp cutting edge and provision for a handle to serve as an efficient harvesting tool like as the present day metal sickle.

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Wheat: Wheat being a rabi crop, it is sown towards the beginning of the winter and harvested towards the end of the spring season and as such grows in fairly cool conditions, abundant snowfall and periodical rains. Because of these conditions the crop requires very little irrigation for its growth and largely relies on natural precipitation. The available palaeobotanical evidence suggests that wheat was the principal and popular crop then. Its popularity can be gauged from the extent of its share of the overall cereal production which was 78.5% around 3000-2500 B.C, 73.68% around 2500-1700 BC and 63.7% around 1700-1000 BC, the slight decline in its proportion towards the later phases being on account of a rise in barley share and the entry of rice as a new variable in the cereal economy. Despite this barley and rice together could not take its place, with the result that wheat continued to remain the principal crop.

The wheat species recovered at Burzahom and Gofkral are *Triticum aestivum* and *Triticum sphaerococcum*, both cultivated forms of wheat. Cultivated wheat forms are classified into three groups: diploid, tetraploid and hexaploid, based on the number of chromosomes present in each type[22]; wherein einkorn wheat is of diploid, emmer, macaroni and rivetare of tetraploid and spelt, club wheat and bread wheat are of hexaploid group.[23] Besides the difference in genomes, these wheats are also different in other respects presenting a heterogeneous character. The marked difference being that while einkorn, emmer and spelt are all glumes in which the grains are not released by free threshing, while the rest of the wheat types are all naked types as their grains are readily released from the glumes by free threshing[24]. Of these, diploid and tetraploid grew as a result of a genetic interaction between wild varieties of wheat and wild grass of the same genetic makeup[25]. On the other hand hexaploid bread wheat species *T. aestivum* and *T. campactum* developed through mutational

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22 Farooq A. Lone, *et al.*, *Palaeoethnobotany*, pp. 116-17.

23 J. Hawkes, *History of Mankind*, p .272.

24 J. Hawkes, *History of Mankind*, p .272

25 Farooq A. Lone, *et al.*, *Palaeoethnobotany*, text figure 2, p. 119.

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changes from tetraploid emmer, while the other species of hexaploid wheat, *T. sphaerococcum*, is said to be a derivative of *T. aestivum* and wild grass *Aegilops*.[26]

Notwithstanding this diversification, the distribution of the wild ancestors of wheat as well as the distribution, ecological behaviour and genetic interaction of weed races and archaeological findings indicate that West Asia was the centre of origin and domestication of the diploid and tetraploid wheat crop around 7000 BC[27]. Later on hexaploid wheat *T. aestivum* (and also *T. campactum*) was also grown in West Asia around 5500 BC[28]. As the growth of *T. aestivum* in Kashmir is recorded as late as 3000 BC it, in all likelihood, was received from some West Asian source, particularly because in the Indian subcontinent, as the available archaeological records suggest, this bread wheat was grown by various people only after 3000 BC[29]. This is the case in spite of the

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26 Farooq A. Lone, *et al.*, *Palaeoethnobotany*, text figure 3, p. 120.

27 The archaeological findings indicate that West Asia in the arc of hilly flanks from Deh Luran plain in Iran through south east Turkey to southern Jordan (the whole area also called fertile crescent) is the centre of origin and domestication of wheat, J. R. Harlon and D. Zohary, 'Distribution of wild wheats and barley', *Science*, No. 153, 1966, p. 1074; J. R. Harlon, 'Agricultural origins: Centers and non-centers', *Science*, No. 174, 1971, pp. 468-74.

28 J. R. Harlon and D. Zohary, *Science*, No. 153, 1966, p. 1074; J. R. Harlon, *Science*, No. 174, 1971, pp. 468-74; J. M. Renfrew, *Palaeoethnobotany: The Pre-historic food plants of Near East and Europe*, London, 1973.

29 The hexaploid wheats of 3rd and 2nd millennium BC were found mainly from Harappan sites but all date after 2500 BC These were *T. campactum* and *T. sphaerococcum* from the Harappan levels, at Mohanjodaro (2500 BC), Harappa (2500 BC) and Chanhodaro (2500 BC), O. Stapf, 'Comment on Cereals and fruits', *Mohanjodaro and Indus Civilization*, John Marshall, London, 1931, p. 586; B. C. Bust, 'Comment on cereals and fruits', *Excavations at Harappa*, M. S. Vats, Delhi, 1941, p. 466; F. R. Shaw, 'Vegetation remains', *Chanhodaro Excavations 1935-36*, E. J. H. Mackay, New Heavan, 1943, pp. 250-51. *T. aestivum* was also found from Harappan levels of Banawali (2500 BC), Farooq A. Lone, M. Khan and G. M. Buth, 'Plant Remains from Banawali, Haryana', *Current Science*, Vol. 56, No. 16, 1987, pp. 837-38; *T. sphaerococcum* from Chirand (2100 BC), Vishnu Mittre, 'Neolithic plant economy of Chirand, Bihar', *Palaeobotanist*, Vol. 22, No. 1, 1972, pp. 18-22; from Kalibangan (2500 BC) the wheat is *Triticum* spp., Vishnu Mittre and R. Savithri, 'Supposed remains of rice in terracotta cakes and pai at Kalibangan, Rajasthan', *Palaeobotanist*, Vol. 22, No. 2, 1975, pp. 124-26.

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fact that Mehargarh in Baluchistan was an early wheat growing centre, established between 6000-5000 B.C, though none of these wheat types was found there[30]. So far as the other hexaploid wheat, *T. sphaerococcum*, is concerned, this wheat is not reported from West Asia nor from the Indian subcontinent at the time was it grown in Kashmir. This obliges one to deduce that it was neither grown under West Asian nor North-West Indian influence. In other words, this bread wheat of Kashmir is the earliest in the subcontinent.[31] Given this fact and that it developed from *T. aestivum* and *Aegilops tausubi*, which grows wild in Kashmir; it allows one to suppose that it could have originated in Kashmir earlier than in any other centre around.[32]

The given record of the origin of the wheat in and around Kashmir would suggest that mutation of *T. sphaerococcum* had taken place earlier in Kashmir and the Neolithic farmer exploited it for its cultivation as soon as he started his culture around 3000 BC. Along with this the other wheat *T. aestivum* was besides available in the pre-Neolithic times and together these were exploited by the people in the pre-Neolithic times for the food and hence the food processing tools they had. It is possibly because of this reason that when man pursued field agriculture in the beginning of the Neolithic culture he laid his hands on the advanced types of seeds that remained with him during the entire period of his culture.

Barley: Barley, like wheat, is another cereal that is sown at the commencement of winter and harvested towards the end of the spring in Kashmir. This automatically renders the crop dependent on winter precipitation for its growth and development. Palaeobotanical studies

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[30] The wheat types are *T. monococcum*, *T. dicoccum* and *T. durum*, J. F. Jarrige and Richard H. Meadow, 'The antecedents of civilization in the Indus Valley', *Scientific America*, Vol. 243, No. 2, 1980, pp 122-32.

[31] Farooq A. Lone, *et al.*, *Palaeoethnobotany*, text figure 3, p. 120.

[32] Before its find in Kashmir it was opined that it might have originated in north west Indian sub-continent after its find there in the Harappan context, M. V. Rao, "wheat" *Evolutionary Studies in World Crops: Diversity and Change in the Indian sub-continent*, Cambridge, 1974. This may still be true if, however, it is reported from any pre Harappan site in the area.

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have shown that it was the major cereal crop grown in then Kashmir after wheat. Its share in the overall cereal economy was 21.5% around 3000-2500 BC, 26.32% around 2500-2000 BC and 25% around 1700-1000 BC.

Barley species, *Hordeum vulgare* and its sub specie *H. vulgare* Linn var. *hexastrichum* was found at Burzahom and Gofkral respectively. These species are cultivated varieties. Cultivated barley originated from the wild variety of self-pollinating two rows *H. spontaneum* giving rise to cultivated two rows *H. disticum* and six rows *H. tetrasticum* and *H. vulgare* variety *hexastrichum*.[33] The early home of barley, like that of wheat, was West Asia where it grew and developed from wild varieties around 7000 BC[34] and the earliest of the six row *H. vulgare* was found there around 6000 BC[35]. In the Indian subcontinent the earliest record of the six rows *H. vulgare* cultivation is found at the Neolithic levels of Mehargarh, between 6000-5000 BC[36]. Thereafter it was found at many other places in the north -west.

As this variety of barley is recorded in Kashmir around 3000 BC one can presume that the seeds of *H. vulgare* reached there from West Asia either independently or via Mehargarh. The latter proposition nevertheless remains unexplainable in view of the fact that the lentil, which was cultivated in Kashmir along with wheat and barley from the beginning of the Neolithic period, has not been found in the north-west India at that time. Presuming that the two cultivated wheat varieties were available in pre-Neolithic Kashmir before the farmers exploited these during the Neolithic times one may assume that along with barley was also available. Since the pre-Neolithic sediments of the Valley have not been studied for the purpose, one has to say that the source of Kashmir barley was an outside one, other than Mehargarh, either a West Asian one or alternatively was it procured from any other

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33 J. Hawkes, *History of Mankind.*, p. 273; Farooq A. Lone, *et al*, *Palaeoethnobotany*, text figure 4, p. 125.

34 J. R. Harlon and D. Zohary, *Science*, p. 153.

35 J. R. Harlon and D. Zohary, *Science*, p. 153; H. Hellback, 'Commentary on the phytogensis of *Triticum* and *Hordeum*', *Economic Botany*, Vol. 20, 1966, p. 350.

36 J. F. Jarrige and Richard Meadow, *Scientific America* Vol. 243, No. 2, 1980, pp 122-32.

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Indian site, where the variety was grown but only before 3000 BC and in association with the lentil, which has not been found so far.

Rice: Rice is presently the major *kharif* crop and is abundantly cultivated all over the Valley. The entire process of its cultivation from sowing the seeds right down to harvesting of the crop is completed during the summer months and, as such, requires a lot of irrigation supported by planned means. Its share, as has been revealed by palaeobotanical researches, was very low in the overall cereal economy, being to the tune of 9.11% at the beginning of its introduction and it was by and large no match for wheat and barley.

The rice grown in Kashmir, *Oryza sativa*, was the cultivated variety of rice. Rice has about twenty wild varieties both of diploid and tetraploid types. Of these, wild rice *O rufipogon Griff* Syn. and *O. perennis* Moench are generally considered to be the ancestors of *O. sativa* which was mostly grown in Asia.[37]

Chronologically speaking this cultivated form of rice evolved over a broad belt that extended from the southern foothills of the Himalayas, across upper Burma, northern Thailand and Laos, to northern Vietnam and southwest and south China.[38] Its earliest record comes from Chinese sites dated around 5000 BC[39]. In India, the archaeological records give a diversified picture of its introduction. There is no record of rice among the Harappans except from the later stages at Rangpur[40] and Lothal[41] where only its husk and spikelets were collected without the rice being identified as a wild or cultivated type. On the other hand at Koldihava, in UP both wild and cultivated rice are

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[37] Farooq A. Lone, *et al, Palaeoethnobotany*, p. 108, there is another variety of rice, *O. glaberrima* which is restricted to the West and Central Africa.

[38] T. T. Chang, 'The ethnobotany of rice in peninsular southeast Asia', *Asian Perspective, 1986.*

[39] Ping-Hi To, *The Cradle of the East*, pp. 60-73; Farooq A. Lone, *et al, Palaeoethnobotany*, table 5.4, pp. 112-13.

[40] Vishnu Mittre and R. Savithri, 'Food economy of Harappans', *Harappan Civilization: a contemporary perspective*, ed. G. L. Posshel, New Delhi, 1982, pp. 205-21.

[41] Vishnu Mittre and R. Savithri, *Harappan Civilization: a contemporary perspective*, pp. 205-21.

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known. This is regarded to be the earliest record of rice in India on the basis of two carbon dates of 5440 ± 240 BC and 4530 ± 135 BC[42]. But the carbon dates of this site are not consistent as the dates from the same level are of 1440±120 BC[43]. Besides, a sequence of carbon dates of the Neolithic levels of around 1500 BC from the nearby site of Mahagara[44] has put the early antiquity of rice in India into question. From another site of the Gangetic plains in Bihar, the Neolithic levels at Chirand, it is established that both wild and cultivated varieties of rice were grown at around 1700 BC.[45] Even though one may find early dated grown rice in the Gangetic basin yet it is also true that its cultivation in India was firmly established only around 2000 BC. [46]

As is detectable from the archaeological record of Gofkral (period IC and II) as well as from Burzahom (period III), the crop was raised between 2000-1700 BC. The fact that the people seem to have not built any contact with the Indian rice cultivation sites suggests an outside origin for the Kashmir variety. The source of its introduction was south-east Chinese sites of the Lung shan period, for two obvious reasons; one that the two specific wild varieties of cultivated rice, as described above, were largely distributed in East Asia including China, and secondly at this period of time the people of Kashmir seem to have had built cultural contacts with the Lung shan people of China.[47] Hence

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42 G. R. Sharma and D. Mandal, 'Excavations at Mahagara, 1977-88 (A Neolithic settlement in Belan Valley)', *Archaeology of the Vindiyas and the Ganga Valley*, Vol. 6, Allahabad, 1980.

43 Tut Tut Ghosh and D. K. Chakrabarti, 'Preliminary notes on the Early History of rice in India', *Man and Environment*, Vol. IV, 1980, p. 60

44 Tut Tut Ghosh and D. K. Chakrabarti, *Man and Environment*, Vol. IV, 1980, p. 60.

45 Tut Tut Ghosh and D. K. Chakrabarti, *Man and Environment*, Vol. IV, 1980, p. 60; Vishnu Mittre, *Palaeobotanist*, Vol. 22.

46 For example at Atrinjikhera from O.C.P. levels onwards i.e. around 2000 BC, Navadatoli around the middle of 2nd millennium BC, Inamgoan from Jorwe culture (1400-700 BC), Mahisdal, from late Chalcolithic and Iron age levels (1400 BC), T. T. Ghosh and D. K. Chakrabarti, *Man and Environment*, Vol. IV, pp. 60-61.

47 Many aspects of Chinese influences have been enumerated by various scholars which are described in the last chapter of this work, but the most important of these is the tool called harvester which has been found at many Neolithic sites of the Yang shao and the Lung shan in China and significantly appears in Kashmir for the first time around 2000 BC at Gofkral (period IC Gofkral, *IAR*, 1981-82) and

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the Neolithic farmer of Kashmir seems to have been largely inspired to grow rice under the Chinese influence.

Millet: Like rice, millet is a cultivable crop sown in the months of the summer season in Kashmir. An instance of its cultivation is recorded from Gofkral along with rice around 2000 BC; and has been identified as *Elevisine coraconna,* which is cultivated millet. The *Elevisine* or *ragi* or finger millet is a tropical plant and its centre of origin is Africa, and it came to be grown in India first during the Neolithic period.[48] Being a tropical plant it is doubtful if finger millet was ever grown in temperate climate of Kashmir. Gofkral finger millet was therefore a mistaken identification[49] of some other type of millet crop, like *Panicem* and *Setaria* which are still available in Kashmir and were also reported from the early historical sediments at Semthan, in the South Kashmir.[50] Both of these millets originated and were grown in China, in the Yellow River valley during the Neolithic times.[51] Because of these facts one may conclude that either one or both of these two types of millet were raised in Kashmir some time around 2000 BC, under the Chinese influence as was the case with rice.

Pulses: Two types of pulses are known from the Neolithic levels of Kashmir. These are lentil (*masur*) and pea. Lentils, first grown in the beginning of period, are *Lens culinaris* (at Burzahom) and *Lens esculanta* Moonch (Gofkral). Both these cultivated varieties have stemmed from the wild *Lens nigrican* which is an endemic species of South Europe and

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even though it is reported from Burzahom period II (2500 BC – 1700 BC) yet out of total of 56 stone harvesters only two are reported from this period (supra Chapter IV, table 2) making it certain that it was introduced very late in Kashmir and the possible source was the Lung shan culture that had this implement then.

48 J. W. Purseglove, *Tropical Crops- Monocotyledons,* Vol. I and II (together), Delhi, 1978, pp. 146-56.

49 Late Prof. G. M. Buth, Palaeobotanist, Department of Botany, University of Kashmir, Srinagar, personal communication.

50 Farooq A. Lone, *et al., Palaeoethnobotany,* pp. 210-11.

51 Ping-Hi Ho, *The Cradle of the East,* pp. 57-60.

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West Asia[52] and alternatively from wild *Lens orientalis* Hand, which is widely distributed in the West Asia.[53] The archaeological records have shown that both the wild lentil and the cultivated lentil was first found in West Asia and therefore it can be safely said that the centre of origin of the cultivated lentil was West Asia in and around 5000 BC[54] where it has remained associated from the very beginning with the cultivation of wheat and barley.

In India, the cultivation of *Lens culinaris* was first found around 1800 BC from the Neolithic levels at Chirand[55] followed by Central Indian Chalcolithic sites of Navdatoli.[56] However, no such reference is known from the Harappan sites[57] which, therefore, indicates that the lentil in Kashmir must have reached from a West Asian source along with wheat and barley[58] and was accordingly grown in Kashmir (from 3000 BC and onwards) later than West Asia but earlier than India. Whatever be its source, the lentil contributed to the pulse configuration from the early Neolithic period and its share in the total agricultural production was as small as 1.75% around 3000-2500 B.C, 1.9% around 2500-1700 BC and 7.2% (including pea) around 1700-1000 BC.

Peas: Peas grown in Kashmir were *Pisum arvense* Linn (Gofkral) and *Pisum sativum* (Burzahom). Both of these types are members of a single species.[59] As direct reference indicating the emergence of the two varieties from a single source is difficult to find, it is presumed that their wild ancestor may be *Pisum elatius* and the intermediatory form *P. arvense* (*P. sativum* variety *arvense*).[60] The earliest record of *P. elatius*

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52 K. Bertsch and F. Bertsch, *Greschichte unserer*, Stuttgart, 1949, c.f., Farooq A. Lone, *et al*, *Palaeoethnobotany*, p. 137.

53 J. M. Renfrew, *Palaeoethnobotany*, 1973.

54 J. M. Renfrew, *Palaeoethnobotany*, 1973.

55 Vishnu Mittre, *Palaeobotanist*, Vol. 22.

56 Vishnu Mittre, *Evolutionary Studies in World Crops*.

57 Vishnu Mittre, *Evolutionary Studies in World Crops*.

58 Farooq A. Lone, *et al.*, *Palaeoethnobotany*, p 138.

59 Farooq A. Lone, *et al.*, *Palaeoethnobotany*, p 138.

60 Farooq A. Lone, *et al.*, *Palaeoethnobotany*, p 138.

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and *P. sativum* var. *arvense* is from the archaeological sites of West Asia of around 7000-5000 BC[61].

In India *P. arvense* has been found at Harappa[62] (2250 BC) Chirand[63] (1800 BC) and Navdatoli (1500 BC)[64]. While in Kashmir, *P. arvense* has been found at Gofkral around 2500 BC suggesting, thereby, that this cultivar reached there from West Asia. *P. sativum* was cultivated at Burzahom around 1700 BC, and since it is not recorded from any contemporary dated Indian site, it might have developed from the intermediary form, *P. arvense*.

Horticulture:

For the cultivation of agricultural products there was required definite human labour that was put in at different stages for the economic pursuits. On the other hand fruit and some of the edible seeds that were consumed during the period necessitated much less labour and upkeep for their cultivation. These fruit trees may have grown in and around their villages of there own in a wild form as is the case in many areas of the Valley still, as we have no direct evidence to suggest that an orchard culture existed then. Even though horticultural produce is not synonymous with agricultural produce, fruit formed part of the food consumed by the man during our period of study. For this reason, therefore, the share of horticulture has been calculated in the overall agricultural economy which was 10.5% around 3000-2500 BC, 19.6% around 2500-1700 BC and 12.8% around 1700-1000 BC[65].

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61 J. M. Renfrew, *Palaeoethnobotany*, 1973.

62 M. S. Vats, *Excavations at Harappa*.

63 Vishnu Mittre, *Palaeobotanist*, Vol. 22.

64 Vishnu Mittre, *Palaeobotanist*, Vol. 22.

65 During the excavations at this site no evidence regarding the agricultural or horticultural products was collected by the excavators. All the data presented about Burzahom is after the side scrapings in the excavated trenches were systematically made there by Prof G. M. Buth of the University of Kashmir and R. N. Kaw of the Archaeological Survey of India in the early eighties of the last century and were reported by them in *Climate and Geology of Kashmir and Central Asia, The last 4 million years*, New Delhi, 1985.

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Walnut: Walnut grew wild along with other forest trees in the entire belt extending from Greece to Asia Minor including Persia, the Himalayas and China.[66] The presence of this plant in the Himalayas is also attested by the fact that the plant was available to Neolithic man in Kashmir as not only the endocarps of domesticated walnut, *Juglans regia*, were found in the record of his culture, but also walnut trees grew during the pre-and the Neolithic period in Kashmir as well. The research conducted by Vishnu Mittre has shown that carbonized woods, leaf impressions and pollen grains of *Juglans* spp. were available in Kashmir from the Plio-Pleistocene and post glacial deposits[67].

Even though there is no record of the walnut tree from any archaeological site in India, yet it was used outside India by certain European Neolithic people[68]. *Juglans regia* is the domesticated variety of walnut available in Kashmir at present and it is said to have been locally domesticated in Kashmir,[69] and it is not, therefore, surprising to find that these people used the seeds of this plant to provide necessary energy enrichment. The domesticated variety of the plant used during the period may have been an offshoot of the wild variety grown in the pre-Neolithic Kashmir.

Prunus: Four Prunus species were found at various levels. These are peach (*Prunus persica*), apricot (*Prunus armeniaca*), almond (*Prunus amygdalus*) and wild cherry or *alich* (*Prunus domestica*). Besides, grape (*Vitis vinifera*) is also known from the deposits. In addition to walnuts, in the beginning the horticulture produce comprised apricot and peach only, almonds, cherry and grapes registered their entry into the fruit configuration towards the later stages as is established by their remains at Burzahom.

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66 J. Hawkes, *History of Mankind*,, p. 278

67 Vishnu Mittre, 'Quaternary Palaeobotany/Palynology in the Himalayan: an Overview', *Palaeobotanist*, Vol. 32, No. 2, 1984, pp. 158-87; the plant remains were also found during the Neolithic period, supra Chapter I and foot note 80.

68 J. Hawkes, *History of Mankind*, p. 278

69 Farooq A. Lone, *et al. Palaeoethnobotany*, p. 140.

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Concerning the history of the origin and development of apricot, it is held that its primary centre of origin was western China and its secondary centre was Central Asia. Likewise the peach originated in western China. The almond originated in a vast area extending from Central to Western Asia, whereas the centre of origin for wild cherry was Europe[70]. However the studies of Vishnu Mittre have shown that *Prunus* spp, to which all these fruit trees belong, was present in Kashmir during the Pleistocene period[71]. It may, therefore, lead one to believe that these plants could have grown wild in the Valley before Neolithic man settled there. Mention may be made here that *alich* or the wild cherry still grows wild there and, therefore, these plants might have been available locally for their exploitation as consumable products.

Grapes were first reported from 2500 BC onwards. It is a wild species[72] identified as *Vitis vinifera*, and is still found from the north eastern Afghanistan to the southern boarders of the Black and Caspian seas[73]. It has been found in the archaeological sites at many places in West Asia[74], including Mehargarh and Nowshera in Pakistan[75]. No pre-Neolithic record of it has been found in Kashmir. The plant may have reached here in its wild state from the centre of its origin which lies in close geographical proximity of Kashmir. For that matter both the wild and cultivated varieties of grape are still available in Kashmir.

Summing up the evidence, agricultural activity in Kashmir seems to have been a result of the influences from different peoples surrounding the Valley. All those agricultural crops that were grown were of those plants whose wild ancestral have not, so for, been recorded in Kashmir. The cereals and pulses grown were available in that state of evolution. And among these wheat, barley and masur cultivated from the very beginning of the culture in Kashmir were of

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70 R. Watkins, 'Cherry, plum, peach, apricot and almond', *Evolution of Crop Plants*, London, 1976, pp. 242-47.

71 Vishnu Mittre, *Evolutionary Studies in World Crops.*

72 Farooq A. Lone, *et al*, *Palaeoethnobotany*, p. 144.

73 Farooq A. Lone, *et al*, *Palaeoethnobotany*, p. 146

74 Farooq A. Lone, *et al*, *Palaeoethnobotany*, p. 144.

75 Farooq A. Lone, *et al*, *Palaeoethnobotany*, p. 144.

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the types that were available in that form in West Asia too. Because of this reason one supposes that they might have reached there together from an unknown West Asian source. There is no other centre or site surrounding Kashmir where all these types were available together then, even though Mehargarh in Baluchistan was an early centre of barley and wheat. But the wheat types that were grown at Mehargarh were of different varieties. Also they do not seem to have cultivated masur, which is found along with the two principal cereals in Kashmir. Unfortunately, information is not clear about cereals of the pre-Harappans, who were close contemporaries of the Neolithic farmers of Kashmir, from whom these cereals could have reached to the Valley since they were closer neighbours to these farmers than the geographically distant West Asians. Also the investigations have not been carried in Kashmir to expose the record of the pre-Neolithians to find out any kind of generic relationship existing between the seeds, which were processed for food, in the two archaeological periods.

Harappan influence in the agriculture sector is to be ruled out as they established their centers only after the Neolithic people had settled in Kashmir. Exception being the pea cultivation that reached Kashmir only around 2500 BC, which was being grown by the Harappans as well then. Similarly cultivation of rice around 2000 BC points towards a contact that these people had established with the Chinese. There is no record that would show that it was known in North-West India at that time but the Lung Shan people in China were certainly growing *Oryza sativa* at this point of time. They were possibly the people who might have also helped in the introduction of millet around this time.

What, however, is certain is that all these products of agricultural crops would have minimized human dependence on hunting and other related means of dependence such as food gathering. Though these crops were numerically few when compared to the present, yet they might have satisfied their needs given the land-man ratio, which would have been in favour of the farmer. They might have, therefore, accumulated a surplus, insofar as the cereals were concerned, to be retained for lay-off periods particularly during the chilly winter months when other sources of food would have been rather difficult to get. The exploitation of horticultural products would have certainly

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helped to supplement food supplies, particularly in the winter months as some of these provide dried edible seeds, which give high calories of energy. In fact when we consider that the farmer was required to cultivate 4.4 acres of land for the sustenance of his family requirements we made him dependent on cereal products alone. In fact this farmer was not totally dependent on the plant foods alone as, besides, the hunting of wild animals he had a variety of domesticated animals to support the food economy and to satisfy his calorie requirements.

Animal food:

The remains of hunting tools such as spears, arrow heads and animal food processing implements like scrapes, skin cutters, etc, together with bones of several types of animals and large number of bone tools recovered from Gofkral and Burzahom excavations, tend to suggest that Neolithic man used animals for different purposes. Most of the animals contributed to human food as is shown by the fractured and charred bones excavated from the residential areas[76]. The animals invariably comprised both wild and domesticated varieties which in a way suggest that, besides agriculture, the needs were met by hunting and herding; their contribution towards food economy varied in different cultural phases at Gofkral[77] as is evident from the following block diagram, Fig. 77 a-d.

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[76] *IAR*, 1981-82.

[77] A K Sharma, *Puratattva;* even though the percentage share of various animals from Burzahom is not known yet the animal bones found there are of stag (*Cervus elephas*), wolf (*Cannis lupus*), dog (*Cannis familairis*), wild cattle or *nilgai* (*Bos elephas*), domesticated cattle (*Bos indicus*), domesticated buffalo (*Babalis bubalis*), domesticated sheep (*Ovis orientalis*), domesticated goat (*Capra hircus*) and pig (*Sus scorfa*), Naseem Ahmad, *The Neolithic Cultures of North western Indo Pakistan Subcontinent*, New Delhi, 1982, p. 174

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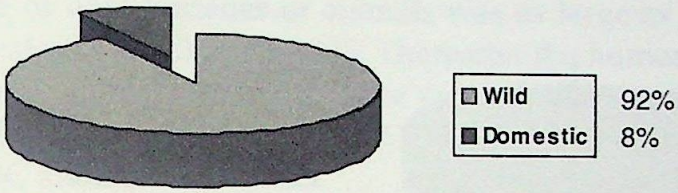

Fig. 77 – a 3000-2500 BC

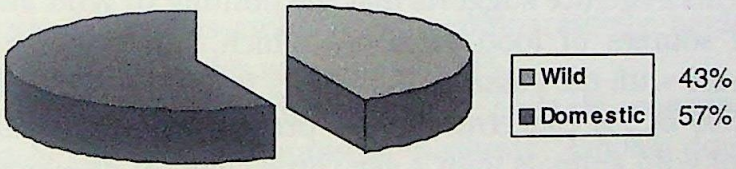

Fig. 77 – b 2500-2000 BC

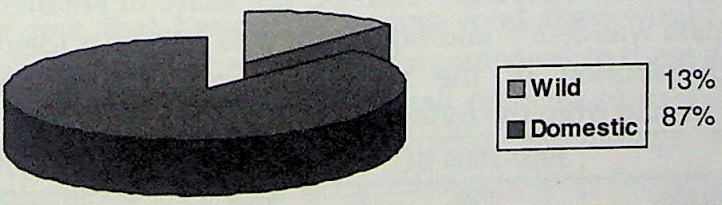

Fig. 77 – c 2000-17000 BC

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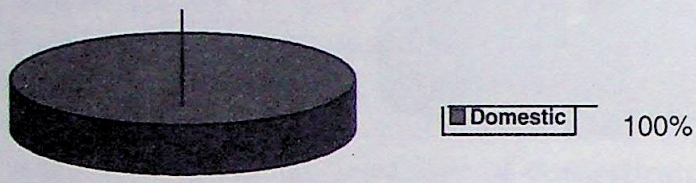

Fig. 77 – d 1700-1000 BC

Fig. 77 Share of wild and domesticated animals in the food

Wild Animals: This evidence suggests that the hunting of wild animals was one of the sources of food economy which, however, showed degrees of decrease with the passage of time. As for as the early period, between 3000-2500 BC, is concerned it was predominantly dominated by the hunting of wild animals with a very little share of domesticates. During this period of time there were two groups of wild animals killed for food. One of these was sheep, goat and cattle, representing the smaller types of animals but having a share of 57.6%, and another group was of large types of animals, represented by ibex, deer and bear having a share of 29.3% in the total osteological assemblage of the wild animals. As against this, from 2500–2000 BC the share of smaller types of the wild animals was 55.8% and larger animals 39%. An idea of the chronological distribution of the various types of wild animals slaughtered can be had from the following table.

Wild Animals	3000-2500 BC	2500-2000 BC	2000-1700 BC
Sheep (*Ovis orientalis*)	25%	10%	0%
Goat (*Capra aegagrus*)	14%	6%	0%
Cattle (*Bos namadicus*)	17%	8%	0%
Deer (*Cervus elephas*)	18%	10%	5%
Ibex (*Capra ibex*)	7%	5%	2%
Bear (*Ursus*)	2%	2%	0%
Dog/Wolf (*Cannis lupus*)	6%	0%	0%
Fish	0%	0%	3%
Miscellaneous	3%	2%	3%
Total	**92%**	**43%**	**16%**

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Domesticated Animals: The table together with the information discussed in the sequel is reflective of the fact that around 3000-2500 BC the share of wild varieties of animals was as large as 92% and that of domesticates as small as 8% only. Thereafter the human dependence on eating wild animals seems to have come down considerably as their contribution dropped down to 43% and 16% respectively between 2500 to 2000 BC and 2000-1700 BC.

The reason for this decrease of dependence on the hunting of wild animals was because of the fact that with the growth and development of the culture people took up animal domestication vigorously along with agriculture. This is the reason why the share of domesticates show sharp increase from 8% to 57% to 84% during the same period of time and beyond 1700 BC the share of wild varieties in the osteological assemblage was comparatively negligible, while the share of domesticates was almost 100%.

Each of the domesticated animals contributed separately towards the food economy in Kashmir. Among domesticates sheep, goat and cattle, as was the case in their wild types, were the major animals to contribute in the food economy. To begin with 100% share went to domesticated sheep and goat between 3000-2500 BC which contributed almost 8% to the animal foods; but in company with cattle the total share of the domesticates was 77% around 2500-2000 BC and 83.3% around 2000-1700 BC a percentage which is considerable in view of the fact that besides providing food they would have helped in agricultural operations as well. As compared to these domesticates, pig, fowl and dog formed a very small percentage in a certain case. The period-wise share of the osteological assemblage of each of these domesticates is exhibited in the following table for simplification.

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Domesticated Animal	3000-2500 BC	2500-2000 BC	2000-1700 BC
Sheep (*Ovis aries*)	5%	14%	25%
Goat (*Capra hircus*)	3%	12%	20%
Cattle (*Bos indicus*)	0%	18%	25%
Pig (*Sus scrofa*)	0%	0%	3%
Fowl (*Gallus gallus*)	0%	3%	4%
Dog (*Cannis familiars*)	0%	10%	10%
Total	**8%**	**57%**	**87%**

Production of farming animal food

The fluctuating trend in the contribution of the two widely varying modes of sustenance, wild and domestic animals, may be attributed, above all else, to the hypothetical reality that in the beginning the farmer in Kashmir was ignorant of animal farming as a new and permanent mode of production. In its absence he was to depend upon hunting which he did almost exclusively in the beginning of the culture along agriculture, which was attained by producing certain types of cereal foods. It was only after that that some of the animals were domesticated[78] to supplement agricultural production and to derive food and the raw materials of clothing, etc from them.

The shift in human priority was the natural corollary of favourable circumstances in which Neolithic man found himself after the adoption of village life. Thus instead of following a tiresome and vulnerable mode of production as in hunting, he preferred a much

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[78] Charles Reed holds that primary requirement for the earliest domestication of sheep, goat, cattle and pig in West Asia was that man settled down to village life first and subsequently stock breading came; this too after plant cultivation, 'The Domestication of Animals in the Prehistoric Near East', *Science*, Vol. CXXX, No. 3389, 1959; and 'The pattern of Animal domestication in the prehistoric Near East', *The Domestication and Exploitation of Plants and Animals*, eds. J. Ucko and G. W. Dimbley, Chicago, 1969, p. 367. The above observation holds well for Kashmir too as the farming pattern suggests. In Kashmir, as in the West Asia too, after the village life was established and after people cultivated, between 3000-2500 BC, wheat, barley and lentil then only at the advanced stage of this period they domesticated sheep and goat.

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easier and comparatively stable and assured source of sustenance by adapting to a farming economy, particularly herding. With pastures abundantly available, as now, for the domesticates particularly the herbivorous bovid species like sheep, goat and cattle, he had hardly to earn food for them and whatever was not eaten by man himself out of his agricultural produce was to be consumed by his animals as food, which is high in cellulose[79]. In return the dung, particularly of cattle and sheep, could be utilized as fertilizer for the fields. Cattle were the first domestic animals capable of pulling a plough and once at Turkepur and Somber long celts were made as plough shares, there would have not only been increase in agricultural produce but even in human and animal population. The Neolithic man, therefore, particularly after the domestication of animals, was to be little worried about the animal food to derive necessary amount of calories, proteins and oils from them.

Requirement of food:

In estimating the per-capita food consumption in the Neolithic period, we used a simple hypothetical principle deriving exclusively from the 700 grams of the cereals 2300 calories of energy required by a person per day. Nevertheless, we are reasonably sure that food-gathering, hunting, fishing and husbandry were all sources of food which together would have provided a large number of calories for the consumption of man. Most calories still would have come from plant foods, since in comparison none of the meat sources had a very high calorie value, except pig which was used but very little and mostly

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[79] A thought more valuable to the solution of problems concerning the beginning of domestication is that sheep, goat and cattle were, by the very nature of their anatomical and physiological organisation, pre-adapted to survive on food, like grasses, straw, twigs, leaves, etc. high in cellulose, which is not directly consumed by man or dog, and can be utilized only inefficiently by pigs, Charles Reed, *The Domestication and Exploitation of Plants and Animals*, p. 365. Only in community where there is an excess of human food can pigs and dogs be tolerated as a part of the biosocial community because dog, man and pig are direct competitors of food while as with bovid there is little competition for food, *Ibid*, 366. Even though bovid rob the crop fields, but once under human control they can be managed and kept away from the fields until harvest.

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towards the end of the Neolithic culture. While edible portion of one kg of goat or sheep meat provides, on an average, 1450 calories and domestic cattle 2000 calories[80] besides a great proportion of proteins, fats and minerals; on the other hand one kg of wheat or barley still give greater proportion of about 3350 calories of energy, accordingly dependence on cereal foods would have been more. This is particularly because man would derive more energy from the direct consumption of such a food than what he would get by feeding it first to his animals and then eating them[81]. For example, to cycle grain through a pig before its consumption by man is to lose more than three-fourths of the potential energy originally present in the grain, thus man may gain lesser degree of protein by its concentration from meat[82].

What we do not know for certain is which of these farming food sources was preferred at any given time. If it is difficult to ascertain the degree of dependence that man had on each individual type of production, it is certain that the degree of dependence on agricultural products for sustenance was to be still less than 2300 calories at this period of time[83]. By the time farming was firmly established, particularly during the middle stages of the period, human dependence on peripatetic life aimed at gathering food from place to place may have substantially dropped; agriculture may have by then been the principal mode of production, while husbandry of food animals[84] may have been an auxiliary source of survival.

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80 Kent V. Flannery, *The Domestication and Exploitation of Plants and Animals*, table 3; see also foot note 17 for the details.

81 Charles Reed, *The Domestication and Exploitation of Plants and Animals*, p. 366.

82 F. Cotterel, *Energy and Society*, New York, 1955, p. 20

83 W. A. Fairservis, Jr., estimates that in Harappa in ancient times the average individual derived 1500-1600 calories from cereals, consuming about 470 gms of these daily, while as the rest of the calories were derived from vegetables, fruits, meat, fish, etc, *The Origin, Character and Decline of an Early Civilization*, p. 34, table 4.

84 Among the animals domesticated from period IB at Gofkral was dog also. Dog was found buried at Burzahom, either individually or in human graves, supra Chapter III. Even though its bones were not found in large quantities at Gofkral as compared to bovid, we have not taken dog along with the food animals. Charles Reed holds that dogs were not eaten in West Asia, *The Domestication and Exploitation of Plants and Animals*, p. 370. It has been found in West Asia and China

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These people thus were in a broad-spectrum era, making a living by diversifying their sustenance strategies, rather than concentrating on one food source. In fact, the synergistic effect of their various food combinations – meat, cereal, lentil, almond, nut, fruit - must have resulted in better nutrition than specialization on a narrower range of products would have produced.

History of animals:

Be it as it may, the stock breeding of all these animals in Kashmir was the result of a gradual process of domestication in which sheep and goat appeared first followed by cattle, fowl, dog and pig. Such a progression shows close resemblance to the domestication pattern available in West Asia[85], even though there is a fundamental difference in time, since the domestication process began there as early as 7000 BC while in Kashmir it started towards the closing stages of the early Neolithic period around 2500 BC. Nevertheless, the major wild types were certainly living in this geographical area when the domestication process began there and their domesticated offspring would not have been difficult to establish in and around the villages.

Domesticated sheep (*Ovis aries*), for instance are believed to have originated from the wild variety of sheep (*Ovis orientalis*)[86]. Likewise domestic goat (*Capra hircus*)[87] and domestic cattle (*Bos indicus*)[88] descended respectively from their wild types, *Capra aegagrus* and *Bos namadicus*. Similarly the ancestor of dog, *Cannis familairis*, has been established to be the wolf (*Cannis lupus*)[89] and the wild pig the ancestor of the domestic pig (*Sus scrofa*)[90]. As all these wild types of

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at large number of sites but nowhere it is recorded that it has been eaten. However, Allchins report dogs were until recently scarified and buried with their masters among such people as the Gilyaks, Ulchis and Goldis of the region of Upper Amur, B. and R. Allchin, *The Rise of Civilization in India and Pakistan*, New Delhi, 1983, p. 116.

85 Charles Reed, *The Domestication and Exploitation of Plants and Animals.*

86 Frederick E. Zeuner, *A History of Domesticated Animals*, New York, 1963, p. 159

87 *A History of Domesticated Animals*, p. 130.

88 *A History of Domesticated Animals*, p.130.

89 *A History of Domesticated Animals*, p. 81.

90 *A History of Domesticated Animals*, p. 256.

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animals at the beginning of the culture were known in the Valley, it, therefore, allows to conclude that these wild ancestors were ultimately responsible for the evolvement of the new species that were domesticated around 2500 BC. Gorden Childe once said that for successful domestication of animals it was necessary to study the animal habits in order to capture the young animals, tame them and to allow their breeding in captivity[91]. The situation that arose, because of whatever reason, allowed the farmer necessary time space of around 400 years to exploit fully and use these natural foods for his benefit.

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[91] Gorden Childe, *What happens in history*, London, 1957, p. 24; and *New Light on the most Ancient East*, London, 1958, p. 23; Charles Reed, records that for more than 99% of their co-existence, man and other animals came together as hunter and prey, man more often being the hunter. The change to man, the domesticator, was thus a major behavioural shift in human adaptation for the utilization of animal resources, *Ibid*, p. 361.

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Chapter VII

THE NEOLITHC SOCIETY

A well established world phenomenon and the distinguishing mark of the first phase of new farming economy was the establishment of settled village. Such a set up is also visible in the sub-continent where the domestication and successful exploitation of plants produced permanent settlements[1]. However, there are places where agriculture did not produce settlements; it only helped to stabilize patterns that were already in making[2].

The pre-Neolithic record of Kashmir has not been exposed to the extent that will reveal if such settlements were available before the farming economy was introduced. The scanty record of the era only leads to a fact that some kind of grain based economy was in existence while taking the food processing tools of the period as the real indicators. There are no indications if the people then were conversant with the farming and cultivation but they seem to have been conversant with the collection of at least some kind of (possibly wild) grains to process them for food. The era may have as such served as the transitional phase for shifting to a broad-spectrum farming economy and further leading towards sedentary life. The incidences of the village based settlements first became known only with the beginning of the Neolithic period. Having adopted farming as a permanent mode of production it was but inevitable to settle down at a place where one constructed a residential house for himself as well as for his cohabitants.

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1 Raymond and Bridget Allchins, *The Rise of Civilization in India and* Pakistan, New Delhi, 1983, p. 97

2 James Mallart, *Neolithic of the Near-East*, London, 1975, p. 277.

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Neolithic Family:

The archaeological sites of Burzahom and Gofkral in particular and other sites in general demonstrate that the settlers lived in the villages continuously, for about two thousand years; and built many types of houses for their dwelling purposes. Each hamlet was a permanent one where all the houses had the built in facilities of comfort to allow living and settling down permanently. With the passage of time the constructional patterns were improved upon for the longer life of the houses; for which the surrounding landscape provided all the resources from that of clay for ramming and plastering to that of timber and stones for building. Again the natural resources provided birch for the roofing which was supplemented by hay and grasses from the agricultural operations.

Whatsoever the resources the construction required an amount of labour to put in, often strenuous for the works like felling of trees and their dressing for the ultimate shapes. The amount of labour was seemingly enormous for the houses were often repaired saving thereby the burden of cost. This, however, never meant that comforts of the inmates were sacrificed at the costs of the labour for they were in the habit of constructing drains around their houses to save these from the rain-water and seepage. For comfortable living these houses were painted with red ochre, a phenomenon still extent in the Valley to keep away insects like ants, and furnishing the floors with mats which may have been supplemented by animal furs, to provide the warmth particularly required in the chilly winters. Given the facilities these houses provided the inmates ample chances to live together, develop social togetherness and live a kind of family living.

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Each of the houses was large enough[3]and capable to accommodate, on average, 6 to 7 individuals to live easily and comfortably with enough space to spread legs and do all types of domestic jobs. The hearth inside the house not only allowed the luxury of cooking inside but also provided the much needed warmth in the winters. The houses were as such capable to serve the needs of their inmates the luxury of living independently in them. This form of house pattern also suggests that each house formed a family unit, which is in contradiction to the common hearth used by a band organization around which they used to raise their dwellings.

Material culture, generally speaking, does not permit to perceive what constituted a family unit. Normal presumption is that a family unit is constituted by a dependable and workable method of pairing off, who conceive and raise children, meet the economic needs of the unit, care for the aged and carry out certain other functions. It in other words means to think of male and female, their children and relatives living together in a household. Sociologists, however, use the term family in several ways and define it as (I) a group with common ancestors; (II) a kinship group united by blood or marriage; (III) a married couple with or without children; (IV) an unmarried couple with children; or (V) one person with children[4]. Accordingly, a generalized definition of a family can be a kinship grouping which provides for the rearing of children and for certain other human needs.

Biologically humans mature late as compared to other animals, as their new born is unable to care for itself at the birth and thereafter as well for many more years, the parents therefore provide a learning environment for them. A house unit with a social group living together

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[3] The exact shape and size of various types of houses at Burzahom and Gofkral is not fully described, but the earliest houses, the pit-chambers, were either square or rectangular. Their size as found in one case was 7 x 6.4 meters, *IAR*, 1966-67, which according to S. S. Saar was the average size, at Burzahom, with slight difference in measurement of its sides, *Archaeology, Ancestors of Kashmir*, New Delhi, 1992, p. 18. However, one big such house, measured 11 meters square, was located near the central part of the mound, called 'community chamber', *Archaeology, Ancestors of Kashmir*, p. 18.

[4] Paul B. Horton and Chester L. Hunt, *Sociology*, Singapore, 1984, p 232

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simplifies such a living besides provides environment conducive for learning quickly to become and function as adults. The new economic pursuits, as compared to the previous regime of hunting-gathering, provided people ample time to spare to care for the new born, develop relationships by living in the houses as social units and make genealogical units with the capacity to build the institution of family. Such a family unit, based on the relationship of male and female, was traditionally responsible for the economic gains of the family as has been depicted on the stone engraving found at Burzahom.

Historically it was with economic development that the institution of family was formed. Will Durant holds that those institutions which seek material welfare there the society add institutions for the perpetuation of race[5]. Adding further he says that 'it is highly improbable that the first human beings lived in isolated families, even at the hunting stage; the inferiority of man in physiological organs of defense would have left such families a prey to marauding beasts ..... He saved himself by solidarity in the hunting pact and the clan. When economic relations replaced kinship as the principle of social organization, the clan lost its position as the sub-structure of society and was supplanted by the family, which assumed the task of reorganizing industry and carrying on the race'.

Today it is being done by husband and wife. This in other words means a marriage which is the association of mates for the care of the offspring[6]; or as the approved social pattern whereby two or more persons establish a family[7]. The records from the sites does not permit to answer the question what was the mechanism for this primitive society to approve as marriage, or in what way was organized the pairing of mates. The institution of marriage with which we are familiar today, with its restrictions and psychological irritations, could not have possibly competed with sexual communism as the mode of satisfying the erotic propensities of people. Nor could the establishment of

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5 Will Durant, *The Story of Civilization: Our Oriental Heritage*, New York, 1935, pp 30-31.

6 Will Durant, *The Story of Civilization*, p 37.

7 Paul B. Horton and Charles L. Haunt, *Sociology*, p 234

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institution of marriage offer at the outset any mechanism of rearing children that would obviously be superior to their rearing by mother, the family and the clan. Some powerful motives must have favoured the evolution of marriage. In all probability these motives were connected with the rising institution of property[8].

The institution of family was in all probability introduced by these social units who either owned property once they built the houses of their own or those used by the co-occupants which were many times repaired by their successive generations, and further owned and inherited by the offsprings. As compared to this sort of living there were hardly any types of houses that would have grouped large number of people to live together any kind of communal life. In fact the separate apartments would give the occupants the right to hold them for their living and thereafter the descendents would involuntarily own these and thus genealogically related groups would strengthen at the expenses of the community to introduce family ownership.

Fundamentally the claim to a house would allow the residents to look after it and split it among themselves once their number grew. Besides many other reasons, one of them for many of the houses to get partitioned was to allow the growing family units to live separately once the genealogically related groups did not approved the sort of animal rutting for the cohabitation. The division of house-units in to family-units may have also helped to create, with the passage of time, a sense of individualism at the cost of communism abandoned for times to come. It was therefore necessary to build individual and separate storage places for the individual houses as against the communal storage pits that existed earlier.

It was in fact a change reflected in approach and thinking, a shift from communal sharing, to give birth to individual owning of resources once the blood related families started to emerge. Each such a family of men, women, and children[9] possibly lived cohesively and in

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8 Will Durant, *The Story of Civilization*, p 39.

9 *IAR*,1962-63; A Basu and A Paul, *Human Remains from Burzahom*, Calcutta, 1980, p 8; of the ten burials five were found of men, three women, one child and one juvenile.

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harmony providing them reasons to love and revere each other. Even after the death of a family member they continued to revere them and placed them in well prepared graves underneath their house floors. The family ties and blood relations, if not any thing else, made them to offer food-offerings to these dead. The skeletal indices and the studies conducted on a various aspects of these skeletons prove that all of them belonged to a single racial group with genetic affinity and ethnic continuity[10]; presupposing thereby that genetic and ethnic factors must have been one of the major factors responsible for the evolution of the family as a social institution during the period.

What is true is that this society did not live in isolation for the family living offered them better means of survival. The genetic affinity in company with the human necessity to offer a joint front against the hazards of nature, besides promoting social cooperation must have persuaded them to contemplate in terms of family grouping. Such family groupings, cohesiveness in approach and living intimately made them to achieve the standardization of their artefacts, like querns, grinders, pottery, stone and bone tools, etc.

Neolithic Village:

A cluster of such families formed, what is presently termed as, a hamlet or a village. Each such a village was large enough to accommodate scores of houses and families at any given time. Spread over the vast loess of a kareawa top, a village on average, like the Gofkral site, measured 400 x 75 meters[11]. Such a village at a height of about 35 meters from the vast fields' surrounding below[12] overlooked a water body nearby, like a stream or a lake[13]. Archaeological detection

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[10] A Basu and A Paul, *Human Remains from Burzahom*, p 79.

[11] *IAR*, 1981-82.; like wise the site of Bomai in Sopore measures about 375 x 45 meters while Burzahom is an extensive one, partly destroyed by the earth cuttings of 1980's and partly under the occupation of a grave yard.

[12] *IAR*, 1981-82. Most of these sites, like Burzahom and Gofkral, are located on karewa tops which, as now, overlook the agriculture fields, rivers, streams, etc located below.

[13] As with many sites a stream flows nearby as the site of Burzahom has the Telbal stream and the Dal Lake nearby while the Bomai has the Wular Lake nearby besides a mountainous stream.

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shows that such villages were, broadly speaking, of two types; first those which were distinctly placed away from each other like the site of Burzahom (see map) which imparts a sense of apartness to the village people, and second those which were comparatively nearer to each other so as to form a cluster of such villages as is shown by the sites around Gofkral (see map). Such village formations would have given rise to a sense of cooperation and closeness. But the village itself, in any case, might have provided a culture of neighbourhood among the dwellers to develop a kind of social behaviour necessary for living in harmony and to accommodate each other in the given space. Taking Gofkral site as a model, a village, excluding the associated slopes, measured about 7.5 acres – an area of space for effective habitation. Even if it is assumed that only one third of space was occupied for the houses, storage pits, cattle–pen and the associated open space utilized for other domestic purposes, such a village would have been having a large number of houses – the exact number of which is not mentioned.[14]

In the absence of any accurate record of the houses built during each stage at these sites, we still figure out that there were at least twenty houses built at Burzahom during the first stage, 3000 – 2500 BC. It is estimated on the basis of twenty one grinders that were found during the excavations from this period alone[15] presuming that each grinder belonged to the occupants of a house for its use in the food

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14 Burzahom had three occupational levels during the period I, *IAR*, 1973-74 and at Gofkral there were two occupational levels during period IA, *IAR*, 1981-82l; while during Period II at Burzahom successive floor levels (with out having their number) were found, *IAR*, 1961-62. Similarly such details are wanting for the number of houses found during the excavations at Burzahom, as in a one season of excavation quite a number of rectangular or square pit-chambers were found of period I, *IAR*, 1964-64; in other seasons of excavations one such chamber was found to the south of menhirs and few more to the north of the menhirs, *IAR*, 1967-68; and in one more season of excavation quite a number of pit chambers were found belonging to period I, *IAR*, 1971-72. However, M. Sharif and B. K. Thapar have reported that forty-five pit-chambers were exposed at Burzahom besides thirty seven circular pits, belonging to period I, 'Food producing, communities in Pakistan and northern India', *History of Civilizations of Central Asia*, eds. A. H. Dani and V. M. Masson, UNESCO, 1992, p. 143.

15 Supra Chapter V, table II.

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processing endeavour. In fact this number would have been more as the archaeological excavations were carried out at a limited space of the site. But otherwise also the number of such houses would not have remained static during the succeeding periods of their existence. With the growth in the population it would have increased, as the archaeologists have unearthed fifty-six more grinders from the next stage of their culture, 2500-1700 BC, at Burzahom,[16] which in other words would mean that there were at least fifty-six houses in the village at any given time during this cultural stage.[17] Such a large number of houses that were increasing in number with the advancement of the culture in a village would have, therefore, given rise to many large sized villages at distant places in the Valley.

All these villages were of permanent nature and inevitably therefore the increase in the number of houses was directly related with the increase in the population of a village. With each day passing each of these villages grew thicker in number of houses and population. It would necessitate widening the economic base, be it in terms of raising the number of the live stock or claiming new land for agricultural purposes. Even if we do not have records to show at what rate the husbandry animals grew yet it is known that at the middle stages the domestication process was in full swing which further grew with the advancement of the culture. It was the time when the farmers claimed forest lands for widening the area of tillage for their hectic economic gains.

All this must have happened at a rate that was more or less three-fold by the middle stages. On the basis of the record of the

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[16] Supra Chapter V, table II.

[17] The figures of twenty and fifty six houses arrived for period I and II respectively are for the limited excavated area wherefrom the grinders were recovered and, as there were three occupational layers in period I and successive floors levels were found in period II, the number of houses in respective periods would accordingly get distributed to various floor levels. The figures of house numbers, as we arrived above, seem to be very conservative in view of the fact that forty-five pit-chambers belonging to period I were located at Burzahom, supra note 14, giving reason to believe that in period II there would have been many more houses, whose number even if is not mentioned could have been three fold .

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material culture we estimated earlier, that there were at least twenty houses at the earliest level and if each house was relatively occupied by 6-7 individuals, the population in the twenty houses of a village would have been around 140 persons (20x7). It would further grow to about 400 persons (56x7) when they had fifty six houses in a village at the middle level to live in.[18] Comprising men, women and children the three fold increase in the number of occupants and the houses is supported by the increase in total number of bone and stone tools that were found at Burzahom during the middle stages of the period. What the evidence suggests is that in comparison to the early stage of their culture there was a three fold increase in the material equipment of these people during the next stage[19] for their use by the increased number of the occupants of the houses in the village.

The growth in population was necessarily dependent on growing base of farming yet it would have also happened because of some other factors as well. One was that farming allowed families to spare more time than ever before and thus more time to care for the babies and reduce their mortality rate. Added to it was the assured supply of cereals and milk necessary for nursing of the babies. Besides it was possibly found beneficial to have higher fertility rates as the children would have also contributed in herding and farming operations to widen the economic base of the families. The arrived pattern of rate of increase in the population in the Neolithic Kashmir, in fact, vindicates the arguments put forth by Gorden Childe who maintained that the Neolithic frame-work actually brought a substantial expansion of population[20].

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[18] As in the case of number of houses the population figures arrived at is for the area of excavation and, considering that one third area of the site was under habitation, the population figures arrived at would still have been more at any given time, particularly when a house was occupied by successive generations. However, these figures of a period would get distributed into smaller numbers given the number of occupational levels at every stage of the culture.

[19] The ratio of tools (stone and bone together) at Burzahom between period I and II was 1:3, supra chapter V, table I and II.

[20] V. G. Childe, *Social Evolution*, London, 1951, p. 22.

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Property and Ownership:

To begin with the land in a village could have been anybody's who made use of it for building a house. The occupants of each house would become the natural owners of those once they were used and held by them. Genealogical linage of the occupants gives them an advantage of their possession and to own the property, unless vacated willingly. Such families would have, therefore, required partitioning the houses once there was pressure of the cohabitants on account of the increase in the size of a family. Again as the size in the population in the village increased there was need to build more houses to accommodate new families that would get established with the passage of time. An unoccupied village land would have been a communal property where not only houses were to be built but would have been used communally for various other purposes; be it for using for cattle-pen, for potters kiln, for tool making workshop, for storage pits or as refuse pits. As each of these houses was provided with a hearth to allow the occupant family to use each of them for domestic use, their house-hold articles like stone and bone implements, food processing equipment like grinders, mullers, querns, etc. or cooking and eating pots, mats, baskets, clothes, ornaments, etc. would have been indispensable and treasured property of the people who made these or used them. The ownership right, or if one may call it the attachment with the things of use, was therefore the reason at times to bury such articles with the dead, like ornaments in use or pots.

The land around a village used for agricultural purposes, to begin with, again could have also been anybody's who made use of it for the purpose. It is held that the practice of agriculture has created belongings, property and ownership[21] but such forms of inferences generally escape archaeological detection, and, therefore, the question whether the right to possess arable land was communal or individual during our period of study has a hypothetical explanation. In the beginning of the period the placement of conical shaped storage pits,

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[21] Will Durant, *The Story of Civilization*, pp. 16-19. He argues that almost everywhere land was owned by the community among primitive people as hunters had no need of private property in land; but when agriculture became the settled life of man tribal property became family property.

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often lined with plaster, on the periphery of settlement and away from the houses at Burzahom would suggest that these were possibly communal storage pits made and used by the villagers, either together or in groups, wherefrom stored articles were taken and used as per the need of any and all families. As at this point of time there were not any individual storage places within the houses or just around, their peripheral placement indirectly leads us to infer that the agricultural produce stored therein must have obviously been a joint property consumed as per the needs of the families in whose possessions each storage pit was. This would also mean that the arable land, available around the settlement, must have obviously been a joint property, held and cultivated together by the families and that the society between 3000–2500 BC had at least no tendency to violate the communal possession of arable land, which was plentifully available in and around their settlement area.

Nevertheless, it is human behaviour that genealogically related groups strengthen at the expense of community and, therefore, with the passage of time family ownership might have got introduced where parents, brothers, sisters, cousins made a claim to the land and its produce.[22] The idea of individual possession of land and its produce appears to have developed towards 2500 BC when families exclusively made separate storage places adjacent to each family apartment to store their hard earned individually produced grains from a piece of land on which the members may have worked exclusively. It was then that the common storage pits were abandoned and filled up.

Consequently, agricultural development brought a great conceptual change; a change that may have lead the groups of families to shift from communally cultivating a piece of land to its cultivation by individual families or in other words to abandon communal property and to introduce family property of the arable land. Accordingly the most economical unit of production must have become the unit of ownership. Besides this, as with the passage of time agricultural operations were conducted outside the vicinities of the villages, individuals by hard labour reclaimed land from forests, jungles or

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22 Jacquetta Hawkes, *History of Mankind*, Vol. I, London, 1963, pp. 262-63.

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marshes such land one would guard jealously as his own, and in the end society was to recognize his right to allow individual property to begin.[23] Thereafter, the entire agricultural process involved from preparing the soil, to sowing of seeds, to cultivation of plants, to protection of fields, to harvesting of crops and its subsequent appropriation must have purely assumed an individualistic character[24].

Economic Pursuits:

Even when individualism may have developed in certain respects, mostly in economic pursuits and individual possessions, yet certain other jobs required a degree of communal pooling of resources like in sharing the diversified acquisitions gained by men through professionalism, or the amount of labour incurred in maintaining the village, or in the performance of rituals, or in making the arrangements for daily necessities. The filtration of water for drinking purposes in the built-in tank at Burzahom during the middle stages of the culture demanded that all in the village created the facility and all were involved in fetching water from a stream, located down below the village, to fill the reserviour regularly for its consumption by the families. Similarly all in the village were to be contributors for the digging of large-sized refuse pits to manage the disposal of the waste products of the village.

Also since, as propounded above, that in the beginning of the culture all agriculture land was in communal possession, the greater proportion of the village population was, therefore, to remain engaged in agriculture though they were simultaneously in know of such crafts as were directly or indirectly related to agricultural operations. Besides being a hunter, fisherman and farmer, this man was also potter, tool maker, weaver, and carpenter at one and the same time to be a multifaceted personality. Given his manifold responsibilities, he must

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[23] E. Westermarck, *Origin and Development of Moral Ideas*, Vol. I, London, 1917, pp. 35-42.

[24] Will Durant, *The Story of Civilization*, p.18. He argues that while communism flourishes most readily in times of dearth, when the common danger of starvation fuses the individual into a group, on the other hand when abundance comes, and the danger subsides, social cohesion is lessened and individualism increases

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have been getting much support from his family members, particularly his spouse for in every social makeup the spouses have been essentially contributing together in sex regulations, biological reproduction and socialization of their young ones. Both of them performed various economic functions, like arranging food and shelter for the family as a whole - a phenomenon authenticated by the Burzahom stone slab engraving depicting a man and woman undertaking a joint venture of hunting.

This piece of archaeological information is significant not because it shows as to how men and women coordinated to enlarge the economic provisions of their family, but also because it furnishes us material for supporting the idea that they must have worked shoulder to shoulder in other fields as well. In support of the female help to the families Will Durant has argued that females were more robust in the primitive societies and equal in stature and endurance to men. He says that the difference in strength, which now divides the sexes, hardly existed in those days, and is now environmental rather than innate in nature. 'Woman, apart from her biological disabilities, was almost equal to man in stature, endurance, resourcefulness and courage; she was a robust animal, able to perform arduous work for long hours, and, if necessary, to fight to death for her children or her clan..... The most economic advances, in early society, were made by women rather than men. While, for centuries, he clang to his ancient ways of hunting and herding, she developed agriculture near the camp, and those busy arts of the home which were to become the most important industries of the later days..... It was apparently she who developed sewing, weaving, basketry, pottery, woodworking and building, and in many cases it was she who carried primitive trade. ... But when agriculture became more complex and brought larger rewards, the stronger sex took more and more of it into his hands. The growth of cattle-breeding gave the man a new source of wealth, stability and power; even agriculture was at last accepted by the wandering male and economic leadership which tillage had for the time given to women was wrested from them by men'.[25]

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25 *Story of Civilization*, pp. 33-43.

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However, given the comparative strong physical stature, the contribution of the men in Kashmir[26] in the overall input labour must have been relatively larger. More so, he must have been entailed hard labour like construction of houses, carpentry, preparation of agricultural fields by hoeing particularly opening up of virgin soil, besides in stone tool-making which entailed strenuous labour at the time of chipping, shaping and grinding. On the other hand the Neolithic women must have been, as they are now, largely engaged in such smooth family affairs as cooking, collection of edibles, fruits, roots, weaving and stitching garments, though during the non-agricultural days of chilly winters, men might have, as they do now, contributed to weaving of clothes. Likewise, in pottery-making, both men and women would have worked jointly as in sowing of seeds, up keeping of their crops, threshing, milking the livestock, manure collection from the cattle pens, etc.

Professional Diversification:

The number of jobs pursued by the villagers must have made their villages self sufficient units to cater the needs of the people and gave these habitations a sort of an independent character that enabled them sustain for about two thousand years. This can be safely said on the basis of recovery of the kitchen ware, agricultural tools, food processing tools, remains of cereal plants from and around their houses. However, with the passage of time, self sufficiency in what was produced and essentially required must not have remained static due to human urge for more biological production, for the sake of supplementing family resources and facilitating agricultural operations. Under the circumstances the substantial increase in the overall population was but natural. The paleontologists who conducted research on the environmental history of the age certify that the period around 2000 BC was marked by an overall increase in the agricultural

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[26] The men, at Burzahom, were on average 176 cms in height while as the women on average were 161 cms in height, A Basu and A Pal, *Human Remains from Burzahom*, pp. 67-72.

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activity which spread in the forest areas at the cost of forest cover.[27] It was around this time, as was estimated above, there was three fold increases in the population of a village which naturally forced to bring more forest cover under the operations of agriculture. Such a dimension was certainly to help in the growth of agricultural production as well. At the same time it enlarged the scope of human need and requirement not only in terms of food but also in the production of diversified articles of use which, as attested at Burzahom, increased three fold in the middle stages.

Since human skills and natural resources are diversely and unequally distributed, a group of people may be enabled, by the developments of specific talents, or by its proximity to the needed material, to produce certain articles more than the others. Standardization of the articles, like various types of bone and stone tools, pottery articles, etc. suggests, with the passage of time, the development of specific talents and skills of the people engaged particularly for such specific craft productions. Besides this, human requirements in turn might have led to the occupational diversification followed by the emergence of a class of specialists in certain crafts or professions. Thus along with the farmers, carpenters, weavers, potters, smiths, etc may have contributed as separate social entities to the village structure once the culture reached towards its maturity.

However, all these social groups, as they are now, grow and contribute for the survival of their culture only if they ware able to develop a close-knit relationship; based on the exchange of their respective products. For no specialist, however important he might have been, could afford to live and produce all that he required for his family, particularly in a situation necessitated by occupational diversification. Therefore, these social groups were inevitably required to enter into a relationship featuring communal pooling and sharing of village resources on the one hand, and exchange of food grains and craft products, on the other. A farmer might have, therefore, provided a certain share of his produce, as now, to the artisan community for they

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[27] Vishnu Mittre, 'Palaeobotanical evidence in India'. *Evolutionary Studies in World Crops, Diversity and Change in the Indian sub-continent*, Cambridge, 1974, pp. 3-30.

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provided him the necessary articles including the much needed tools required for agricultural activity.

Such exchanges might have remained personal, direct and specific either inside a village or within the ring of several villages located near each other. In due course of time, the canvas of this exchange-based relationship seems to have widened with the entry of certain extraneous articles. This happened when these villagers imported some luxury items, like hundreds of carnelian beads or painted red pottery from the cultures outside Kashmir. The imports were to be acquired with the emergence of a class of travelers who were presented certain articles as gift exchanges[28] or were got in lieu of their possessions as in the process of trade[29] or else there was a class of people who preferred nomadic or pastoral way of life and acted as carriers between two communities or cultures for their goods. Such people, being for the most part of their time on move, could have helped in the spread of knowledge of potting, weaving, manufacture of other articles etc., particularly such articles as bear affinities of the equipment of other cultures.[30]

Governance and Village Chief:

The very existence of numerous occupational levels habituated by groups of people living in any kind of social gathering or behaviour would normally demand for some kind of a mechanism that could regulate their inter-relations and weave them into a large economic web. To bring in peace, stability and discipline in a society it is necessary that the economic pursuits are governed, in a family or a

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28 In societies where institutions of trade are not sharply differentiated, gift exchanges shade imperceptibly into trade, M. J. Herskovits, *Cultural Anthropology*, an abridged revision of *Man and His Works*, Indian edition, New Delhi, 1974, p. 152.

29 Trade, properly speaking, consists of direct exchange of values, *Cultural Anthropology*, but the societies making or producing such articles more than it consumes and offers its surplus to other people in exchange of its own, as in barter, this is the origin of trade. But trade in surpluses was at first by an interchange of gifts, gradually an orderly system of barter grew up. Will Durant, *The Story of Civilization*, p. 15.

30 See last Chapter for such affinities.

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society, in a way that all in a village are satisfied to the extent of receiving the resources of their hard earned agricultural produce on the terms that allow them to sustain a living. It would require some kind of communal or family order to split the gains through sustainable communal sharing. For such an order or governance the experiences of elders or leaders in a family would have helped in living a peaceful and successful life. Besides serving for other purposes like rituals, rites etc the presence of community halls in the centre of habitations, as at Burzahom[31], may have offered the leaders opportunities to consult each other and decide the matters.

With the passage of time when communal sharing of the agricultural productions was replaced by individualism, and population growth and further development of the culture was taking place, a group or clan of several such families in a village with one ethnic background may have required to be governed in an order that could attain the desired objectives in sustaining a social organization in a behaviour of harmony and stability. This in other words could allow believing that a class of elders or leaders would have emerged of its own in due course of time in a clan, tribe, village or group of villages[32].

Though we have no direct evidence which would point out the emergence and the presence of a head or chief of a clan or the village, yet archaeological evidence allows inferring that an elite group of individuals was in existence whose funeral remains were found buried in well prepared graves under the house floors. The fact is that not all the people of the village were buried in this way and therefore, the treatment of disposal of dead was not, in all probability, the practice of the common masses or else once the practice of burial of the dead started the commoners were buried out side the habitation in a cemetery which has not been located so far. The present evidence would accordingly make one to believe that those buried under the house floors must have been belonging to a class or group of people

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31 *IAR*, 1962-63; 1966-67; S. S. Saar, *Archaeology*, p. 18.

32 The earliest form of continuous social organisation was a clan – a group of related families occupying a common track of land having the same totems and taboos and governed by the same customs; when a group of clans united, under the same chief, the tribe was formed, Will Durant, *The Story of Civilization*, pp. 21-22.

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who were none else than the most privileged persons like the head of a village or his kith or kin inhabiting the village.

The emergence of this class of society was a slow development and appeared only after about 500 years of the existence of the villages when the governance may have become more complex owing to new agricultural developments and setting up of individualism in the society. Such a group of ruling class was possibly not required and hence absent in the earlier stages as no burial practice is known to have existed during the early period. That during the middle and the late stages the house-floor burial practice was followed in terms of this referral group only shows that the most privileged persons of the times had emerged whose one of the function was to act as a ruling class. They certainly must have commanded respect from the ruled class of a village is evident from the fact that these villagers incurred huge expenditure of labour on the performance of their funerary rites, from the preparation of graves, to the painting of skeleton remains and later on erecting huge megalithic architecture at the sites. All this was done as a patent of respectability. It would, therefore, also lead to assume that this society was, broadly speaking, fragmented into privileged and unprivileged classes.

Whatever the case, the chief of the village as a distinguished person would have been charged with the responsibility of conducting the community affairs for the sake of ensuring peace as a pre-requisite for gradual and continued development. He may have held consultations with the elders in a village to arrive on decisions for the conduct of affairs and as such there was found the need to raise community halls at these sites for the assembly of such advisers. Because of such needs the community halls were placed in the centre of the village that may have also allowed other types of community meetings or social groupings like performance of rituals, rites, etc. As a matter of fact, these settlements appear to be comparatively peaceful socio-economic units for we do not come across any war weapon from their sites or from the graves of their dead. Even their settlements appear to have been devoid of any defense mechanism like the ditches or fencing around. The presence of a few compact walls at one or the other stage of their habitational level is to be taken as part of the defense strategy

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against the onslaught of the beasts than the humans. The domesticated dog must have also played an important role not only in the safeguard of the villages but also in keeping the domesticated flock together, as it was used in hunting of the wild animals.

Religious Perspectives:

Having advanced through various phases and making cultural innovations these prehistoric villagers seem to have developed certain kinds of metaphysical orientations, for one or the other reasons, be it for a moral and legal code, or for dependence to gain in the worldly affairs that is an integral part of family and social affairs. To worship supernatural forces is religion; which is also establishment of rites, mandatory ceremonies, sacrifices and taboos. It has a direct ideological and psychological effect on the consciousness of individual who is accustomed to relying on religion for support and consolation in any progress and failure. In broadest term, religion may best be defined as belief in and identification with greater forces or power[33].

Given the characteristics of the culture, the society on the whole required support for the consolidation of the economic base to rely on a force or forces that could control the external environment for sustainable living. Such a belief system is dependent on a complex series of adaptive social mechanisms that has developed as humans struggled for survival[34]. In other words it is a web of beliefs which hold culture together through myth, symbols and rituals[35]. Circumstances would demand this man to establish and follow a set of rites and rituals that gave him opportunities to keep the living alive where inherent dangers were inevitable, and complex. To secure the general well being of a family whose prosperity was ensured through hard labour and toil, it was imperative for the society to make arrangements to explain and adjust to the external environment by means of animistic practices[36] ; or by means of magic[37].

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33 M. J. Herskovits, *Cultural Anthropology*, p. 233.

34 Edward O. Willson, *Sociobiology*, 1975.

35 Mircea Eliada, *The Encyclopedia of Religion*, 1987; Clifford Geertz, *The Interpretation of Cultures*, 1973

36 E. B. Tyler, *Primitive Culture*, 1871

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As some kind of prosperity was achieved in the villages the society must have lived a kind of joyful life, if not all the time but most of it. Any sad movement was, like the death of a dear one, full of grief. As such death, if not anything else, may have been one aspect to develop ideas about the conception of super-natural realm of existence. It is said that fear, above all, of death was the first mother of gods.[38] It is also said that Early man may have believed that all living things in the universe contained certain spiritual (soul or secret life) or hidden gods,[39] which always threatened the human mind with the fear of death; to escape there from, the human beings may have tried to appease the spirits by opting a certain mode of worship which came later on termed as religion.

Thus if religion is perceived to be animism or the belief that natural phenomena are due to spirits and the dead have spirits, then this man of Kashmir was not averse to such a religion. However to him religion does not seem to have evolved with the faith in the existence of the Ultimate God but in the worship of many gods. This may have been one of the reason that they buried their dead to prevent their return for they were probably feared; and had to be placated lest they should curse and blight the lives of the living.[40] Besides this form of religion, most human gods, moreover, seem to have been merely idealized dead men giving rise to a sort of cult of the dead or of the ancestors.[41] The burials of men, women and children seem to point to a high degree of respect for the dead as the graves, in which they were buried, were

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[37] J. G. Frazer, *The Golden Bough*, New York, 1930

[38] Will Durant, *The Story of Civilization*, p. 57.

[39] *The Story of Civilization*, pp. 58-59.

[40] Will Durant, *The Story of Civilization*, p. 58.

[41] Herbert Spencer taught that religion grew from emotional states, pointing to ancestor worship as both responding to and provoking further emotions of respect and fear, *The Principles of Sociology*, 1896; even though Max Muller also believed that emotional reasoning stood for the same yet he stressed that spontaneous emotional reactions of awe, wonder, and fear evoked by natural phenomena was the reason for religious growth in the primitive societies, *Origin and Growth of Religion*, 1892; while R. R. Marett stressed awe but in the presence of a supernatural power as the primal, pre-animistic stage of religion, *The Threshold of Religion*, 2nd edition, 1914.

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carefully dug and smoothened with a coat of plaster on the surrounding walls. These dead were so revered by the living members of a family that the graves were dug not away from their residences but under the floors of their living houses. That apart, the corpses were treated in a manner that sounded optimum regard towards the ancestors. Out of the deep family attachment besides the consideration of propitiating the secret souls and ensuring 'life-giving energy to the dead'[42] the skeletal remains were painted with red ochre. Significantly, the living members would not hesitate undertaking the tiresome job of re-opening the graves for skeletal painting, after the body flesh had decayed.[43]

The appearance of the dead in their dreams was possibly a strong reason to establish that the dead are living entities.[44] The red painting of the skeletal remains was thus a rite which was performed under the concept of living corpses with a belief that they continued to live. In order to make sure that the 'corpse should not come back to curse the living members'; various goods and personal ornaments were sometimes buried along with the dead. Victuals were also made for the dead probably under metaphysical intuitions, as cooked food and remains of other funeral feasts have been located in the graves at Burzahom. The impulses of life after death seem to have been strong enough and existed throughout their existence in Kashmir as food offerings were made not only at the time of burial of the dead but thereafter too. All in all the ritual of the people to dig graves, plaster them, paint the skeletal remains and to provide food offerings at any stage of the death, suggests that the people had an idea of physical continuity of the dead and believed in all likelihood that the dead ancestors were still among their living ancestors.

Perhaps under the very considerations of animism that living things contained one or the other kind of spirit and that there is life

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42 J. Hawkes, *History of Mankind*, p. 208.

43 A. K. Sharma, 'Neolithic Human Burials from Burzahom, Kashmir', *Journal of Oriental Institute of Baroda*, Vol. XVI, No. 3, 1967.

44 Primitive man did not disassociate dreaming from the waking world, and it is easy to see how dream experiences could enhance the natural emotions and reverentical attitude, J. Hawkes, *History of Mankind*, p. 208

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after death, they seem to have had a scientific knowledge for they followed a practice of trephining the human skull. A careful study of a female skeleton recovered at Burzahom reveals that neat and round disks of bone were chiseled out to make small holes on the head. While elsewhere this kind of 'surgical operation' was conducted upon the heads of living persons,[45] so as to release through these holes, 'mad spirits' or 'harmful things intruded in their spirits',[46] in Kashmir it has been said to have been performed on the skull of the deceased person exactly at the time of skeletal painting of the corpse in the grave itself and *in situ* position[47]. There are also claimants who say it was performed on the living lady at Burzahom[48]. They argue that the lady was suffering from a kind of a disease, and was therefore insane, epileptic or otherwise "different" that forced the operation to carry out as 'the very carefully performed trepanation with the strong likelihood of several different stages/sittings on a possibly anomalous skull, does argue for a clear case of surgery performed for predominantly medical reasons on a living person who has not survived the procedure'[49]. On the contrary it has been claimed that there is no evidence of bone healing and therefore the operation was post mortem.

Whatever may have happened there are in all, 11 attempts of trepanation on the cranium. Barring a minor depression on the top of the right parietal (no. 11 in the Fig.....), all attempts are on the left parietal bone. There are six completed perforations (nos. 1 to 6) which represent the final stage of trepanation. All these holes are nearly circular or oval in outline, ranging in maximum diameter from 5 to 14 mm. While at other places (nos. 7 and11) depressions are very shallow

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[45] A Basu and A Pal, *Human Remains from Burzahom*, p. 19; J. Hawkes, *History of Mankind*, p. 342.

[46] J. Hawkes, *History of Mankind* p. 342.

[47] A Basu and A. Pal, *Human Remains from Burzahom*, p. 17.

[48] B. and F. Allchin, *The Birth of Indian Civilization*, Cambridge, 1968; Anek R. Sankhyan and George Weber, 'Evidence of Surgery in Ancient India: Trepanation at Burzahom (Kashmir) over 4000 years ago' *International Journal of Osteoarchaeology* , Vol. 11, 2001, pp 375-380.

[49] Anek R. Sankhyan and George Weber, *International Journal of Osteoarchaeology* , Vol. 11, 2001.

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and elongated and only the outer table of the bone has been removed and at nos. 9 and 10 the depressions are deeper with the outer table of the bone removed into the diploic space, leaving the inner table intact. The next attempt was made at no. 8 where a much deeper depression was created yet a hole was not achieved. Whether it is case of ante mortem or post-mortem, the skull operation, itself an astonishing act, was conducted in Kashmir to uphold a metaphysical belief that possibly the lady contained 'evil' spirits which required to be given a way out.

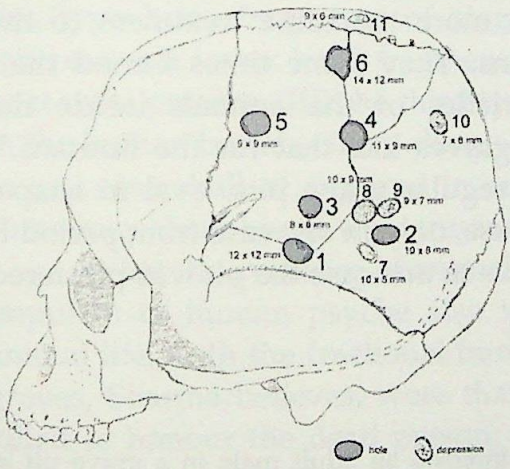

Fig. 78 Trephined head, Burzahom.

It is to be borne in mind, however, that most primitive societies regard disease as an invasion of spirits which are usually but not invariably thought to be evil. Also, medical and surgical procedures in such societies are so closely intertwined with belief, ritual and magic that they cannot neatly be separated. Cases of mental illness, epilepsy and suchlike, are also widely regarded as messengers of the gods with the afflicted often given a very special, even sacred, position in society. Trepanation in the case of the Burzahom ante mortem skull and elsewhere could merely represent the surgical part of a much more elaborate medico-ritual ceremonial procedure. In case it was post mortem it was a rite based upon ancestor worship itself.[50]

A further proof of such funeral rites seeking to magnify the ancestor respect and their inherent propensity to worship the dead can be visualized from the huge megaliths raised in and around the

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[50] Basu and Pal believe that the operation was conducted for some magico-religious purpose when the skeleton was exposed for the application of red-ochre or for some ritual purposes, *Human Remains from Burzahom*, p. 17 and p. 19.

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graves.[51] These monumental stones were planted towards the late stages in Kashmir[52] suggesting thereby that by this time the idea of death and its related funerary rites had been firmly established in human mind. However, as it is true that all the people did not receive the floor burial it, therefore, leads to suggest that people who had been powerful during their life or belonged to a powerful family, group or clan, and, therefore, had been feared or revered, were especially likely to be worshiped after their death.[53]

Probably, fear was the origin of totemism too.[54] Significantly, the society seems to have given much more the same treatment to the animals as they gave to the humans. They some times buried their domesticated as well as wild varieties of the animals inside the habitational area in well-prepared graves like that for the humans.[55] Like humans they were buried in regular grave pits, oval in shape, narrow at the top and wider at the base, only in one case from period II the pit was irregular in shape while as in one case the pit was plastered with lime from inside.

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[51] Below one of the menhirs was found interred an adult male in a grave pit at Burzahom, B. M. Pande, 'The Neolithic culture in Kashmir: New Discoveries' *The Anthropologist*, Vol. 17, No. 1 & 2, 1970, pp. 25-41; however, he further adds that these megaliths did not contain any funerary remains directly below them and were most likely commemorative rather than funerary in character.

[52] Besides Burzahom and Gofkral Megaliths have been found in Kashmir at Begagund, Pampore, Hariparigom, *IAR*, 1962-63; Dadsar, *IAR*, 1966-67; Brah and Waztal, *IAR, 1969-70.*

[53] Herbert Spencer, *Sociology*, Vol. I, New York, 1910, p. 406; J. G. Frazer, *Golden Bough*, p. vii.

[54] Will Durant, *The Story of Civilization*, p. 62. Totemism denotes vaguely any worship of a particular object – usually an animal or a plant – as especially sacred to a group, *Ibid*, p. 61; the totem as a religious object helped to unify a clan and a tribe that worshiped it, whose members thought themselves bound up with it or descended from it; it as a symbol or object became a useful sign of relationship and distinction for primitive peoples, *Ibid*, p. 62.

[55] Like human burials, animal graves belong to period II and III at Burzahom, *IAR*, 1962-63; most of these were of Period III while only two cases were found of Period II, A. K. Sharma, 'Animal burials from Burzahom – A Neolithic settlement in Kashmir', *Journal of Oriental Institute of Baroda*, Vol. XVIII, No. 1 and 2, 1968.

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Sharma classifies these animal burials into three type; (I) primary burials having complete skeletons, either single or two animals in the same grave at different levels, mostly of dogs and, in two cases of wolves; where two animals were in a grave, the two animals were dogs only in one case the one at higher level was of a wolf; (II) fractional burials having fragmentary bones, in one case of wild dogs along with two antlers of a stag. The dog bones included five intact skulls to which were attached portions of vertebral columns besides fragments of ribs, limbs and pelvic bones bearing fracture marks. In another example of this type bone fragments of stag were deposited at a higher level whereas at a lower level fragmentary bones of antler, dog, sheep and goat were present; (III) the third type had bones which were deposited in the human burials either along with the humans or at a higher level, in one case skull of dog and in other cases bones of goat and antler; sometimes these bones were treated with red-ochre.[56]

What the evidence of animal burial indicates is that the religious impulses of human psyche also went out towards the animals and animal life. Both the fractional burials and the bones buried in human graves, Sharma believes, were that of sacrificial animals, which were killed to honour the dead person; of these some were striped of their flesh or a feast of flesh made and then ceremonially buried[57]. The burial practice of the animals, which were treated as dearly as the humans, may lead to assume that this society believed in animal cult akin to totemism.[58] Such a mystical relationship between men and animals seems to have continued for generations together that is why one or the other kind of animal was found buried in the graves at different stages of the culture. Significantly a stone engraving found at Burzahom, depicting an abstract representation of an animal in a thatched roofed

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56 A. K. Sharma, *Journal of Oriental Institute of Baroda*, Vol. XVIII.

57 A. K. Sharma, *Journal of Oriental Institute of Baroda*, Vol. XVIII.

58 It is also said that in most cases the totem animal was tabu – i.e. forbidden, not to be touched; under certain circumstances it might be eaten, but only as a religious act, amounting to the ritual eating of god, S. Frend, *Totem and Taboo*, Leipzig, 1913; Will Durant, *The Story of Civilization*, p. 62.

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trap, called tectiform,[59] characterizes a magical rite[60] or a magico-religious belief[61] intended to trap evil spirits.[62] It may even point to the mythological ritual[63] underlying human-totem relationship.

Be it as it may, the engraving of the tectiform together with the other forms of worship testifies that the population was mystically oriented and the characterization and symbolisation of their beliefs required large number of rites to be performed. As these religious rites became more numerous, they might have outgrown the knowledge and competence of an ordinary man, to generate a specialist class, be it the priests or privileged persons or clan lords,[64] who gave most of their time to the functions and ceremonies of their religion. It was possibly this specialist who took the savory food, ate all the edible parts of it himself and offered only the remains and bones upon the alter (graves).[65] It was expectedly he who was capable to get erected

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[59] B. M. Pande, 'A Neolithic Tectiform from Burzahom, District Srinagar', *Journal of Indian Anthropological Society*, Vol. 7, 1972, pp. 175-77

[60] *Journal of Indian Anthropological Society.*

[61] J. G. Frazer, *Golden Bough*, Vol. I, pp. 220-25. Magic is an antecedent to the worship of gods; techniques of magic stand in contrast to prayer – though not in opposition; magic is used with reference to a specific problem while the gods are propitiated for general well being as such magic is difficult to be distinguished fully from the worship of gods and is actually an integral part of religion, M. J. Herskovits, *Cultural Anthropology*, pp. 221-25.

[62] B. M. Pande, *Journal of Indian Anthropological Society.*

[63] Ritual is the implementation of belief, myth the 'charter of belief' and gives point and meaning to the ritualistic behaviour that derives from it sanctions ... and therefore, if mythology gives belief its charter, ritual is the instrument by which conviction is renewed and strengthened, M. J. Herskovits, *Cultural Anthropology*, pp. 229-30.

[64] Will Durant, *The Story of Civilization*, p. 22. He holds that it is war that makes the chief, the king and the state, just as it is these that make war .... In the intervals of peace, it was the priest or head magician who had most authority and influence; and when at last permanent kingship developed as the usual mode of government among the majority of tribes, it combined – and derived from – the offices of warrior, father and priest.

[65] W. G. Sumner, *Folk Ways*, Boston, 1906, pp. 336-39, 553-55. As at Burzahom some animal bones were buried in human graves at different levels of the grave fillings; offered to the dead at different times after the person's death; sometimes these

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imposing funerary architectures at the grave sites as only such 'divine' people could have enjoyed enough social power to inspire the people to spend unprecedented labour for the transportation and plantation of imposing funerary architectures. The dead, because of their efforts, therefore, never got annihilated but continued to live among the living entities. This class of specialists, however, did not create religion themselves; they merely used it as an agent through which religion got nourished.[66]

All the rites of these people reflect a sense of solidarity and attachment, relationship and bondage between the dead and the living people. Be it preparation of graves for the dead, honouring the corpses, the skeletal painting, or the trephining of the skull or the erecting huge monumental stones, all such rituals were performed not only as means to express optimum degree of attachment and respect for the dead but also as a means to certify different forms of worship. A pertinent question remains as to what was the source of the human thought for the belief in life after death.

In this regard, the process of germination of seeds must have greatly influenced the people. The development of agriculture must have brought home to them the relation of death to life for seeds which seem to be dead are born anew.[67] In the process of seed germination and production, water, earth, light and heat are indispensable. Of the celestial objects of worship, the sun seems to have been deified by this society in Kashmir, as a male deity, while the earth in that case might have been a female deity.[68] The depiction of the sun, in a hunting scene engraved on a stone slab at Burzahom, as well as on a rock surface at

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were painted with red ochre carrying thereby the meaning that the edible parts of the food were eaten and only the bones were offered to the dead.

66 Will Durant, *The Story of Civilization*, p. 68.

67 Robert, S. Ellwood, Jr., *Many People, Many Faiths*, New Jersey, 2nd Edition 1982, p. 20.

68 Will Durant, *The Story of Civilization*, p. 59-60. Perhaps it was when agriculture replaced hunting that the sun was worshiped and its heat was recognised as the main cause of the bounty of the soil, *Ibid*, p. 59. The earth became then a mother goddess fertilized by hot rays, and men worshiped the sun as the father of all living things, Robert Briffault, *The Mothers*, Vol. 3, New York, 1927, p. 147.

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Bomai not far away from the Neolithic site there, may have been done with a view to re-affirm human belief in the sun as a deity having the inherent power to multiply the game; the cults of the sun and of fertility merge together as was believed elsewhere by the Neolithic people.[69]This radiating sun on the engraving together with the orientation of most of the dead in the graves facing the sun is evidence that the burial cult itself was related to cosmic conceptions. Moreover, the large megaliths form large circles on the grave-sites reaffirms that such a belief might have continued till the very end of their civilization in Kashmir. It is generally held that when agriculture replaced hunting the heat of the sun was recognised as the main cause of the bounty of the soil[70] and the earth - a mother goddess fertilized by hot rays, and men worshiped the sun as the father of all living things[71]. The depiction of the sun symbols on the stone surfaces was made at a time when agriculture was not pursued or was in an incipient stage which re-affirms human belief in the sun as a deity having the inherent power to multiply the game.

The development of agriculture may have equally obliged these people to believe, and rightly so, that the processes involved in the seed and human production were by and large analogous; hence might have held the belief that what was the role of the earth in plant germination, a mother's womb had the same role in human production. This is most certainly why they buried some of their dead, significantly women and infants, in embryonic postures[72] possibly believing thereby that the dead would seek rebirth as usually happens to a fetus in the female womb which ultimately grows into a baby, child and adult.

It is believed that in earliest human groups the physiological role of the male in reproduction appears to have escaped notice quite as completely as among animals, which rut and mate and breed with

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69 Emmanuel Anati, *Comonica Valley* London, 1964, pp. 163-64, c.f. B. M. Pande, *Asian Perspective.* It is also said that solar symbolism was fairly common in Neolithic times, Johannes Maringer, *The Gods of Primitive Man,* London, 1960, pp.169-73, 197-200.

70 Will Durant, *The Story of Civilization*, pp. 59-60.

71 Robert Briffault, *The Mothers*, Vol. 3, New York, 1927, p. 147.

72 A Basu and A Pal, *Human Remains from Burzahom*, p. 4.

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happy unconsciousness of cause and effect[73]. However, the role of a male and his genital organ in the whole process of biological reproduction must have been well known to these people in Kashmir. Even though we do not find any instance where any kind of female genital or its symbolic form has been depicted yet the cult of fertility existed then is indeed understood from the effort which they made while depicting magnified male genitals in the hunting scene engraved on a stone slab. Even though we believe that human genitals have not been depicted but are the tails of animal skins yet it is also true that an exaggerated dog genital has been made. Normally such a representation of the genital and, that too in exaggerated size, was not required to be depicted in a hunting scene. But the people seem to have done the same willfully keeping in view the importance of the organ as the most indispensable symbol of human as well as animal reproduction.[74] Accordingly the scene as a whole, with sun symbols, stag and the genitals, together with figures of male and female humans becomes a fertility scene, and may, therefore, as a whole convey the prevalence of fertility concept among the people.

The depiction of a horned bucranian head, painted on a globular pot as found at Burzahom, if not an intelligible totem, may equally be viewed as an emblem of masculine fertility. In view of its inherent capacity to reproduce, the deity might have been the first icon of god for the people in Kashmir that, however, was imported from across the cultural boarders. Such depictions show that from the fear and worship of formless spirits the society seem to have passed from adoration of celestial and sexual powers, to reverence of animals and worship of ancestors, and to iconization of god.

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[73] Will Durant, *The Story of Civilization*, p. 31.

[74] The primitive man does not know anything about the ovum or the sperm; he sees only the external structures involved, and deifies them; they, too, have spirits in them and must be worshiped, for are not these mysteriously creative powers the most marvelous of all? In them, even more than in soil, the miracle of fertility and growth appears; therefore, they must be the most direct embodiments of the divine potency, Will Durant, *The Story of Civilization*, p. 61.

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Chapter VIII

AFFINITIES AND CONTACTS

Palaeontological and archaeological studies have shown human existence only in a few pockets of the world during the Palaeolithic period. On the other hand vast regions in Africa, Europe, Americas and Asia were thickly inhabited before the end of the Neolithic period. In other words one may say that it took about 2 million years to man spread in the globe with his culture that was at different stages of evolution at various places. From the stage of crude flake and hand-axe culture it took man hundreds of thousands of years to reach to a stage of efficient and sharp edged ground tool-culture which eventually gave way to new modes of human life all over the world.

Whatever be the starting point of human existence in different regions of the world, it remains a universal truth that the experience and training in arts, crafts, beliefs and social institutions started slowly and developed gradually. This general pattern of evolution of human cultures is witnessed in Kashmir too, from the beginning of the Palaeolithic period down up to the Neolithic period. There the latest culture was, broadly speaking, a product of the co-existence of many sided inter- and intra-relations among the humans, who across the length and breadth of the Valley occupied the vast loess deposits on the karewa tops adjacent to the river Jehlum and its many tributaries.

Both in appearance and formation these river sites seem to have been fairly populated villages wherein were built large number of houses; semi-subterranean square shaped pit-chambers followed by over-ground mud and timber houses. The people were no more nomads as they had discontinued the habit of roaming around in search of food. They settled down permanently in the villages and nearby toiled and laboured to grow and rear their farming crops and animals for their food and to lay a permanent foundation for a dependable economic growth. These wonderful achievements helped

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them to develop far-reaching social or communal relations, at the same time they equally contributed to the evolution of faith which was translated into practice while worshipping several objects or things, be they natural or man made. Their rich heritage visible in the archaeological remains is indeed indicative of a developed culture.

Having said so, one pertinent question remains as to who were these people? Did they arrive in Kashmir just with the beginning of the Neolithic period? Or where they descendants of those people who lived before them in the Palaeolithic Kashmir? Soon after the excavations at Burzahom were started in the 60's of the last century the material culture so exposed there threw many questions about the origin of these people, their relationships with the cultures outside as well as their living standards.

Prof. H. D. Sankalia believed that the people of the Neolithic Kashmir were not natives but were definitely 'colonists' who came from outside far 'gradual local development is not hitherto known nor are their antecedents known'.[1] He fairly distinguishes these people from those who inhabited Kashmir during the Palaeolithic period. While supporting Prof. Sankalia, Khazanchi held that they could have come from Central Asia, particularly the North and Central China[2] though he did not furnish any scientific reasoning in this regard. He based his argument on certain affinities that some of the material culture of Kashmir had with the Neolithic cultures that obtained in the North and Central China, Shilka valley and some Neolithic sites in the eastern Siberia, in Russia.[3] Before drawing any final conclusion, one needs to examine separately the views of Prof. Sankalia and Khazanchi.

At the time Prof. Sankalia formulated his viewpoint, there was very little Palaeolithic evidence available in Kashmir, save that which was exposed by Prof Sankalia himself. However, the researchers that followed him have revealed several results, which put to question the opinion of Prof. Sankalia regarding the relations that obtained between

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1 H. D. Sankalia, *Prehistory and Protohistory of India and Pakistan*, Poona, 1974, p. 303.

2 T. N. Khazanchi in R. K. Kak, 'Burzahom – The Historical Place', *Kashmir Today*, Vol. VIII, No. III, August, 1981, p.4.

3 T. N. Khazanchi, 'North-Western Neolithic Cultures of India', *Newsletter*, Nos. 7 and 8, Indian Institute of Advanced Study, Shimla, 1977, p. 24.

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the Palaeolithic and the Neolithic people of Kashmir. We may recall that during the Palaeolithic period the Valley was occupied by a vast lake without any drainage for water. The Valley-floor was as such not available for the overground vegetation as well as for the living of the mammals. It was the time when climate was fluctuating broadly between cold and warm stages and even the vegetation cover of the mountains was changing in accordance with the available climate.

But in Kashmir man lived in all these situations and survived on hunting of a variety of large animals that lived in his company. As the fossilized record of many of the mammals on whom man would have lived and many of the man made tools have been found from the glacial deposits, this man seems to have withstood the severe cold climate of the glacial periods. The tools recovered from several Palaeolithic areas, particularly from the foot of a river valley at Mansbal, located on the banks of the vast prehistoric Valley Lake, are considerably important in the sense that they at least point towards the fact that the prehistoric man changed his habitate from high altitude mountain valleys to the lower reaches. It is the period when the prehistoric lake was either still stationary or had just started to recede.

Even after the drainage of the lake it would not have been possible to occupy the Valley floor for thousands more years for its muddy and swampy nature. The physiography at Mansbal, contrary to open high river valley, makes it possible to judge that man not only moved to comparatively low altitudes but also was located in dwelling abodes such as in the caves. The habitational caves at Mansbal and various Palaeolithic tools located there suggest that prehistoric man could withstand the severity of weather and protect him from the possible attacks from roaming animals. By way of such placement he could think to understand the environmental situation available around him and to acquire knowledge about the nature. Such a situation would naturally allow him to be more organized in his approach towards his living and understanding the nature and habitat would allow organizing his hunting more skillfully. This also means to live in communities at one place which eventually would help him to develop social groups and fellow-feelings as a prerequisite to build up cultural foundations for the posterity.

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For him things further eased out after the Valley Lake drained out to allow new physiography of the karewas to emerge. After these got stabilized, the Palaeolithic man, thereupon, chose these foot–hills as his living grounds as is evidenced by the findings of the Upper Palaeolithic assemblage from the karewa soils, laying thereby foundations of a culture which was acknowledged by the succeeding generations including the one that survived during the Neolithic culture. Infact the succeeding Neolithic culture shows distinct signs of evolution, spatial differentiation and clear technological affinities with the preceding Palaeolithic culture[4] which is proved by chopper like discoidal cores, borers, flake tools and scrapers recovered from the preceramic horizons at Kuladur, Tapribal, Balapur, etc. Indeed all these tools are of an antecedent stage that existed just before the fully developed Neolithic period in Kashmir.

Even though it is difficult to guess about the mode of production adopted by these people yet hunting might have contributed largely to their food economy as is certified by the tools found. Together with these tools, they also had backed knives, grinders and pounders which suggest some kind of grain collection or incipient agricultural activity at this pre-Neolithic stage as the definite proof regarding grain based food economy is yet to be traced out. Agriculture as a permanent mode of production, supplemented by animal husbandry, was adopted only at the start of the Neolithic period though hunting as a reminiscence of the Palaeolithic period was not abandoned by the people. They lived in groups inside their villages and thereby honoured the rich heritage of fellow-feeling that was transmitted to them by their predecessors. Thus there was a definite evolutionary continuity, and no break in the relations existing between the Palaeolithic and the Neolithic people of Kashmir is found. All this evidence thereby establishes a scope for disagreeing with the opinion of Prof Sankalia that the Neolithic people of Kashmir were aliens and thus far removed from those who preceded them in the Palaeolithic period.

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[4] R.K. Pant, C. Gaillard, V. Nautiyal, G. S. Gaur and S.L. Shali, `Some new lithic and ceramic industries from Kashmir', *Man and Environment*, Vol. VI, 1982, p 38.

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Khazanchi's view point that these people had affinities with Shilka valley and other sites in eastern Siberia for they, like them, pursued fishing and hunting as a dominant mode of production, particularly because of the large equipment of hunting tools like harpoons, daggers, arrow-heads and points available in Kashmir bone industry,[5] also does not hold good in the face of modern researches. The studies contrarily reveal, as discussed earlier, that farming of plants and rearing animals was the principal and hunting of wild animals only as the secondary source of sustenance for the Burzahomites.

At the time Khazanchi made his observations he had not collected any kind of cereal cultivation evidence at Burzahom nor were the relics of the domesticated animals collected systematically. The evidence was collected thereafter and has changed the very nature of the mode of production of these societies. True, equipment used in hunting, fishing, etc and plans adopted for raising houses, exhibit certain typological resemblance with outside cultures located in China and Siberia, as has been detailed out by Fairservis[6] but these are not the only areas where the analogies can be found. Similarly the Allchins regard that Burzahomites had affinities with the Neolithic and surrounding hunting people of the peripheral regions, north and north west of China and of Central Asia, particularly because of the practice of animal burial common in these areas[7]. Nonetheless, vast differences

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5 T.N. Khazanchi, *Newsletter.*

6 W.A. Fairservis Jr., remarks that textured (combed) pottery, rectangular knives (harvesters), polished stone celts of ovoid or quadrangular type and stone-rings (mace heads), pit-houses, all have direct analogies in southern Siberia (Minusink, Transbaikalia), Mongolia, Manchuria and Northern China while as dog eating, flexed burials, pole-houses are also found in eastern (Lung shan) and northern (Yang shao) China, *The Roots of Ancient India,* London, 1971, pp 312-13.

7 The Allchins report that burial of dog with their masters was found in Ang-Ang Hsi culture of Manchuria and dog was almost cult animal in the Shilka cave culture of the upper Amur; and this animal was until recently sacrificed and buried with their masters among such people as the Gilyaks, Ulchis and Goldis of this region, Bridget and Raymond Allchin, *The Rise of Civilization in India and Pakistan,* New Delhi, 1983, p 116.

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still remain between Burzahomites and Central Asians with particular reference to the Chinese.

Central China was the nuclear area wherefrom knowledge pertaining to the development of Neolithic culture diffused in the surrounding areas in the Far East. We know there were two principal Neolithic cultures in China, the earlier North Central China Yang shao which as per the corrected chronometric dating spread from 4800 to 3300 BC, and the later Eastern China Lung shan culture which began around 2700 BC; in between these two cultures there were one or two regional cultures in the north east Manchuria and adjacent areas, called Lungshanoids which resembles more with the Lung shan cultures. Both these cultures had their characteristic features, even though the Lung shan was basically similar to the Yang shao in economy and material culture. The Yang shao culture had its nuclear area on the Wei river, mostly on its numerous tributaries, on the loess land south of Ordous desert and north of Cho'in Ling mountains, while as Lung shan culture developed in the Far East coast on the flood plains of the lower Hungho, covering the modern provinces of Hanan, Hopei, Shantang, and northern parts of Anhui and Kangsu[8].

The Yang shao villages were divided into dwelling area outlined by ditches 5-6 meters deep and wide, a kiln area for pottery making and village cemetery for the burial of dead while the Lung shan had no such sub-division of their villages. The Yang shao houses, built in a cluster at the centre of a village, were 3-5 meters in diameter, mostly round and occasionally oblong or square having plastered floors. They were semi-subterranean or at ground level with wattle and daub foundation. Sometimes they had also long houses with partitioned

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We have, however, noted earlier that only in one human grave at Burzahom there was found a skull of a dog while the rest of these animals were buried separately, supra chapter III. Gupta holds that Siberian sites are far removed from Kashmir and also harpoons, etc. differ considerably in techno-typology. He, however, argues that Ordous Central China (Yang shao), Yunan (Lung shan) and Burzahom have their ultimate origin in the Neolithic Ordous culture of Northern China (Yang shao nuclear area), S.P. Gupta, 'Neolithic Problems in India', *Indian Prehistory*, eds, V.N. Mishra and M.S. Mate, Poona, 1964, pp 99-101.

[8] K.C. Chang, *The Archaeology of Ancient China*, New Heaven, 1968.

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compartments. Each of the houses and compartment had a fire place inside. The Lung shan houses were circular, with a concave depression in the middle for hearth. Sometimes these houses were semi-subterranean, 1 meter deep with a flight of steps at the entrance. They also built storage pits rectangular or circular in shape. The Lung shan villages were outlined by a stamped earth wall. They buried their dead within their settlement area in rectangular pits, in extended positions with ventral side facing up. On the other hand the Yang shao people buried their dead outside their settlements, in village cemetery in neat rows, mostly single but exceptionally double or quadruple, lying face upwards and stretched out, while their infants and children were buried in urns between the dwelling houses[9].

It is a fact that both in China and Kashmir the Neolithic people lived in semi-subterranean houses, pit–chambers, at one or the other stage but the structural pattern reflects variations of profound nature. Whereas the pit-chamber type houses in Kashmir were largely square or rectangular in shape, in China such houses were mostly circular, and only occasionally oblong or square in the Yang shao culture (4800-3300 BC). The possibility that the Kashmiris borrowed the square type pattern from the Chinese is to be ruled out in the face of the vast variety of difference that existed invariably in the settlement pattern of the villages of the Yang shao and Kashmir. Unlike the Yang shao people, for instance, the people in Kashmir did not follow the pattern of dividing the village land into settlement area for the purpose of habitation, kiln area for pottery and cemetery for burial of the dead. Nor were the settlement areas separated with ditches around; for defense purposes. Contrarily, however, the extents of the Kashmir settlements were dotted all around with pits; for storage purpose. Because of such diversity Kashmiris were not indebted to the Yang shao Chinese in terms of designing the semi-subterranean houses.[10]

Particularly because, Chinese were not the only people who knew the art of raising the pit-chamber type houses. Largely square

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9 K.C. Chang, *The Archaeology of Ancient China.*

10 The Lung shan people are to be ruled out for any kind of influence at the beginning of the Neolithic culture in Kashmir as they started their culture some three hundred years after Kashmir.

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and occasionally round pit-chamber type houses were also discovered in all the five cultural phases of Jamon Neolithic culture in Japan.[11] Likewise in former USSR such dwelling houses were found in the European forest zone as well as in Ukraine to Kiev[12] at many places belonging to the Neolithic period. Similarly in West Asia such houses have been found at the Neolithic sites at Beidha, Ramand (Levant),[13] Abu-Zureiq (near Hazorea),[14] M'lefaat (Iraq),[15] Tepe Asiab and Tepe Sarab (Iran),[16] and Swat[17] (Pakistan). All this, therefore, suffices to prove that such a structural pattern of houses was the offshoot of a universal rather than a regional phenomenon.

Even if it is presumed that such types of structures were raised under the Chinese influence especially under the Yang shao influence in Kashmir, yet we cannot trace out any sort of migration of people from China to Kashmir. There remain certain marked variations, besides in culture, in terms of racial and genetic comparisons of the two peoples. While the Chinese, both the Yang shao and the Lung shan, were of Mongoloid stock,[18] the Kashmiris on the other hand were having physical features of the Caucasoids.

In view of such broad differentiation, the opinion of Dikshit that the Neolithic Kashmir was a part or an extension of the East-Asian culture[19] is not maintainable. Besides genetic differences, broad cultural differences also existed between the two peoples. For example, unlike the Yang shao culture, wherefrom major diffusion of the culture in Kashmir could have taken place, as they antedated the Kashmiris; there

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11 G.J. Groote, *The Prehistory of Japan*, New York, 1951, pp 37-69.

12 Alexander Mongait, *Archaeology in USSR*, London, 1961, pp 91-122; A. Bryusov, `Neolithic dwellings in the forest zone of the European part of the USSR', *Proceeding of the Prehistoric Society*, New Series, Vol. 21, Cambridge, 1952, pp 78-79.

13 Prushotam Sing, *The Neolithic Cultures of West Asia*, London, 1974, pp 22, 49.

14 Prushotam Sing, *The Neolithic Cultures of West Asia*, p 48.

15 James Mallart, *The Neolithic Cultures of Near East*, London, 1975, p 74.

16 Prushotam Sing, *The Neolithic Cultures of West Asia*, pp. 166-67.

17 G. Stacul, `Dwelling and Storage pits at Loebanr III (Swat, Pakistan), 1976 Excavation Report'' *East and West*, Vol 27, Rome, 1977, pp 229-35.

18 Ping-Ti Ho, *The Cradle of the East*, Honking, 1973, p 38, 343.

19 K.N. Dikshit, 'The Neolithic cultural frontiers of Kashmir', *Man and Environment*, Vol VI, 1982, p 35.

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have been found no separate burial grounds in and around the settled villages of Kashmir. Instead the dead humans were buried within the settlement area and inside the living houses under their floors. Again, such a practice of burial under the house floors seems to be of a universal pattern as is certified by the archaeological findings at Catal-Huyuk (Anatolia)[20] and Sialk in Iran[21], besides at the Lung shan Chinese sites.

Presumed again that such a ritual was followed after the Chinese but then the burial practice started there from the very beginning of the Yang shao culture, and unlike them the burial practice itself was followed after about 600 years of the appearance of the culture in Kashmir. This was the time when Yang shao culture was no more existing and what practically remained in the Neolithic China was the Lung shan culture in the far south. The south Chinese culture appeared hundreds years after the Kashmir culture was established and if any kind of Chinese affinity is found there it could have appeared only very late.

To ascribe to a theory based on the assumption and contrary to the facts that the Neolithic culture in Kashmir is part of the Chinese culture seems hazardous in view of the differences existing between the two. Even if one will find similarities in the ritualistic approach adopted in the two regions like the skeletal painting of the dead yet such a ritual was not exactly comparable. Again even if not many graves have been found in Kashmir yet many of those skeletons of the dead in Kashmir were painted with red-ochre but unlike them, out of hundreds of the Chinese finds, only one single skeleton was found painted with red ochre and that too was kept in a coffin urn.[22] At the same time, the said ritual was followed very commonly in the Neolithic burials of the former USSR,[23] Japan[24] as well as in West Asia at Ramand

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20 Prushotam Sing, *The Neolithic Cultures of West Asia, p. 100.*

21 James Mallart, *The Neolithic Cultures of Near-East*, p. 191.

22 T. K. Cheng, *Archaeology in China*, Vol I (*Prehistoric China*), Cambridge, 1959, p. 81.

23 Alexander Mongait, *Archaeology in USSR*, pp 103-122.

24 G.J. Groote, *The Prehistory of Japan*, p 66.

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(Levant)[25] Catal-Huyuk (Anatolia),[26] Tepe Asiab and Haji Firuz culture,[27] Sialk, Zagha and Tepe Sagzabad[28] and Hissar[29] in Iran.

In addition to this, various types of the Neolithic pottery of Kashmir rules out the scope of influence following the diffusion of knowledge from China. Since even postulation of stimulus of diffusion requires material evidence and it is difficult to establish any real cultural affinity between the pottery groups of the Chinese cultures and that of Kashmir, the ceramic industry of Kashmir seem almost certain to have occurred independently and without the influence of the Chinese Neolithians. More so because in China pottery was available to the Neolithic people from the very beginning, even earlier; on the other hand in Kashmir after the birth of the culture in 3000 BC no pottery was known for the first 500-600 years. The only affinity, which the two pottery groups can be had, is reflected in the established reality that both had cord-impressed pottery, called combed ware in Kashmir; whereas this pottery developed in China around 5000 BC,[30] on the other hand it was produced in Kashmir as late as around 2000 BC, i.e. almost around 1000 years after the onset of the culture.[31]

In other respects too the ceramic complexes of the two regions are fairly distinguishable as in China pottery preceded field agriculture, on the contrary in Kashmir, as in West Asia, pottery followed the grain-centered agriculture. Equally important is the fact that along with the pottery of the cord-marked type, the painted pottery in China was of a large number and variety.[32] In Kashmir on the other hand, such an element is totally absent, except one pot bearing bucranian head, which having the Iranian origin, seems to have reached Kashmir via the Indus

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25 Prushotam Sing, *The Neolithic Cultures of West Asia*, p 150.

26 Prushotam Sing, *The Neolithic Cultures of West Asia, p. 100.*

27 Prushotam Sing, *The Neolithic Cultures of West Asia, 167-190.*

28 James Melart, *The Neolithic Cultures of Near East*, p 190-91.

29 A.K. Sharma, 'Neolithic Human Burials from Burzahom, Kashmir,' *Journal of Oriental Institute, Baroda*, Vol 16, 1967, p. 242.

30 Ping.-Ti Ho, *The Cradle of the East*, pp 124-27.

31 The cord-marked pottery developed in Kashmir after the first pottery, thick-coarse grey ware that developed around 2500 BC.

32 K.C. Chang, *The Archaeology of Ancient China*; Ping-Ti Ho, *The Cradle of the East*, pp. 131-175.

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Civilization (see the sequel). Even in the shapes of vessels, the Kashmir pottery is different and do not bear any Chinese influence. There are many typical shapes in China, like Yang shao *tseng*- steamer, a bowl shaped vessel with holes in the bottom, *ting*-tripod, a bowl shaped vessel with a tripod, the Lungshanoids and Lung shan *li*-tripod, a jar with a tripod either having a handle or without a handle[33], none of these typical types were found in Kashmir.

Some of the common shapes of certain simple vessels of daily use, such as basin having curvilinear sides, are found in the Neolithic China which too appears, more or less, practically in ceramic traditions, at many places.[34] That is why we find some square bowls having round base, straightened four walls with rising curved tops and four corners slightly depressed or else the bowls with tapering straight sides and straight base or for that matter the great variety of jars with flaring rims, long necks, globular body having flat bottom, these typical of Kashmir pottery shapes are without having parallel in China. Likewise the other important vessels, like the globular pots or jars which have near spherical bodies with either low neck or without any neck, but invariably having round bottom or flat bottom on hollow stand, are not found in China.

Pots with almost similar shapes, particularly those with round bottom, are found at many places in West Asia like at Hassuna. Significantly like that of West Asia, Kashmir pottery is invariably hand-made while Chinese pottery is said to have been made on turntable.[35] Similarly, pots like common type of jars or bowls with a little modification here or there had analogy in Sarai Khola. Moreover, like Sarai Khola Kashmir pottery had also burnished types, which,

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33 Ping-Ti Ho, *The Cradle of the East*, pp 131-132.

34 Seton Lloyd and Fuad Safar, "Tell Hassuna: The excavations by Iraq Government in 1943-44, *Journal of Near Eastern Studies*, Vol IV, No. 4, 1945; at Hassuna dishes and saucers are fairly common among pottery wares, similarly such dishes are found near home at Sarai Khola, M. R. Mughal, 'The Sarai Khola pottery types of the Early periods I and II, *Pakistan Archaeology*, Vol. 8, 1972, Fig. 23; as well as in the pre-Harappan and Harappan sites but in painted ware as at Amri, Kalibangan, Mundigak, Harappa, etc. B. and F. Allchin, *The Rise of Civilization in India and Pakistan*.

35 Ping-Ti Ho, *The Cradle of the East*, p 135.

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however, were mostly of black shades while at Sarai Khola they were generally in red shades. There were similarities in terms of mat-impression on the base of a few pots, as was the case with early pottery in China, and North West Pakistan at Gumla, Levan, Mehargarh, etc.[36]

In other respects too vast differences existed between the cultures of Kashmir and China. In the Neolithic China, the food economy depended on the cultivation of millet and pig farming from the very beginning,[37] while as rice entered the Chinese life around 4000 B.C.[38] followed by wheat and barley around 1300 B.C.[39] Contrary to this type of primary grain based economy, Kashmir featured primarily wheat, barley and *masur* cultivation from the very beginning of the Neolithic culture at around 3000 BC, followed by rice around 2000 BC. Again there was difference in the farming pattern of the two regions, sheep, goat and cattle were the first to have been domesticated in Kashmir and not on the Chinese pattern of pig farming but exactly on the West Asian and Mehargarh pattern. At Mehargarh, however, *masur* cultivation was not reported from the Neolithic levels along with wheat and barley while as cattle (Bos and water buffalo) contributed largely and sheep and goat only insignificantly to the respective economy; on the other hand in Kashmir sheep, goat and cattle contributed almost equally to the Neolithic economy.

All this evidence, thereby, leaves very little scope to believe in, what is called, `cultural invasion or diffusion' from China to give birth to the Neolithic culture in Kashmir. What the above discussion suggests, one may argue, is that for the first one thousand years the Neolithic culture of Kashmir was devoid of any of the Neolithic Chinese imprints. Nevertheless, Chinese cultural imprints began to be first felt around 2000 BC when Kashmir for the first time seems to have come into contact with the Lung shan people, the only Chinese living in

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36 B. and F Allchin, *The Rise of Civilization in India and Pakistan*, pp 107-11.

37 Ping-Ti Ho, *The Cradle of the East*, p 352.

38 Ping-Ti Ho, *The Cradle of the East*, p 347. He, however, records that earliest rice culture has been found outside the Yang shao nuclear area and did not enter into the proper Yang shao sites but spread to peripheral areas of the Yang shao before entering the Lung shan sites around 2700 B.C.

39 Ping-Ti Ho, *The Cradle of the East*, p 352.

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the Neolithic age at this period of time. As a proof, it may be said that it was then that for the first time the existing agricultural economy of Kashmir was supplemented by the characteristic features of the Neolithic economy of the Chinese -- rice and millet cultivation, as also pig farming got introduced, even though limitedly.

Simultaneously, the characteristic tool of Neolithic Kashmir, the harvester, both in semi-lunar and rectangular shapes, was introduced in the Neolithic assemblage at Gofkral and Burzahom. While Yang shao people in China had semi-lunar shaped stone knife, the Lung shan had both the shapes and obviously because of the typological similarities it was from the Lung shan cultures that the harvester got introduced in Kashmir during the middle stages of the Neolithic period. It must have reached Kashmir around 2000 BC as is evident from its findings at Gofkral in the cultural stage dated between 2000 and 1700 BC (period IC). Burzahom had it during the large cultural stage II dated between 2500-1700 BC but then out of 56 stone harvesters reported from the site only two were of period II giving thus an indication of its late introduction there as well.

All Chinese imprints have therefore reached Kashmir from the Lung shan culture and around 2000 BC in the form of rice, millet, pig or harvester. A relevant question is as to what were the agencies or who were the people involved in transmitting, whatever little or large, Chinese influences to Kashmir? Not necessarily were they the Chinese themselves to travel to Kashmir, for neither any Mongoloid genetic group was traced in Kashmir nor any veritable relics of the Neolithic China were found along the possible routes leading into Kashmir. There are no intermediary sources or ethenic groups present on and around the possible routes through which a possible migration or trait infiltration could have taken place neither through Sinkiang – Tibet – Ladakh nor through Sinkiang – Gilgit route, the two routes that were in use between Kashmir and China during the historical ages, which could have also been used in the prehistoric times because of their geographical proximity through this area. In this area the establishment of the Neolithic communities from the North China is far from clear.

On the other hand, we have the definite reason to believe that the Neolithic people of Kashmir might have been largely instrumental

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in this endeavor because of their extra-territorial contacts. It is indeed because of their in a way globalised state of affairs that Kashmir became the entrepot of ideas and cultural traits not only from China but from other areas as well, and whatever cultural 'imports' we have, they are only sporadic and therefore, do not present the trait infiltrations of foreign cultures in totality. Sometimes they are not even synchronized in time, while at times they appear to be mere copies of the people living outside Kashmir, as is the case of Gofkral copper hair pin, described earlier.

Despite this, we should not hold back our opinion that the Neolithic culture of Kashmir was a cultural mosaic which took shape as a result of congregation of ideas and coalescence of influences of various cultures. It is because of such reasons that the equipment of Kashmir show, even though rudimentary, similarities with outside equipment. This is vindicated by Krishnaswami who on the basis of typological resemblances, round butt and cylindrical shapes, observed that ground stone tools of Kashmir had a definite western influence of Iran and Bulachistan.[40] Take for example Kashmir stone tools of which celts, adzes, chisels and mace heads had their analogies in Pakistan at Kachibegi, Loralai, Kile Gul Mohammed, Harappa, Mohanjodaro, Nal, Lewan[41] and Sarai Khola.[42] While only a few types of Kashmir bone-tools were found in Bulachistan and North-West Pakistan and Sarai Khola but a good number with a variety of form was found in Manchuria (China), Siberia and in the Jamon culture. Rudimentary similarities are also found in bone harpoons of Kashmir with those of Manchuria while eyed needles and awls were found at both these places in great number, projecting typological similarities.

Similarities are even established by the fact that people in the Kashmir painted their house-floors with red ochre (Gofkral period IA, Burzahom period I and II). It was a practice which was simultaneously

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40 V.D. Krishnaswami, `The Neolithic pattern of India', *Ancient India*, No. 16, 1962, p 34.

41 Shashi Asthana, *History and Archaeology of India's contacts with other countries*, Delhi, 1976, p 80.

42 M.A. Halim, `Excavations at Sarai Khola'; *Pakistan Archaeology*, Vol 8, 1972, pp 7-13.

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in vogue not only in Mehargarh[43] but also in Djeitun culture[44] (Turkmenistan), Hacilar[45] and Can-Hasan[46] (Turkey), Beidh[47] (Levant) and Deh-Luran[48] (Iran). Even though such similarities antedate Kashmir cultural imprints yet various traits may have become wide spread in a vast area; from West Asia to Central Asia to China to Japan. Such traits were visible in technological innovations or in the shapes of certain types of the tools and luxury goods; be it stone or bone tools or the Gofkral type copper pin. The natives seem to have accepted foreign influences for the fabrication or the production of their equipment necessary for their living or the adopted life style, at the same time they appear to have equally reciprocated by providing necessary ideas to their neighbours for the development of their cultures as was the case at Ghaligai, Aligmara and Loebanr in Swat valley (Pakistan). Swat Neolithic culture was of a later date than Kashmir and had coarse grey and black burnished pottery, pit-houses, ground stone tools, bone-tools and even *masur* along with wheat, barley and rice[49], all showing cultural traits of the Neolithic Kashmir.

Since human cultures progress due to integrated activities of distinct social groups and communities, it is not as such surprising to see Kashmir and its neighbours borrowing each others influences in the respective social behaviour, settlement pattern, tool technology, designing of craft objects or development of economy. However, such a

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43 J.F. Jarrige and M. Lachevallier, `Excavations at Mehargarh, Bulachistan; their significance in prehistoric context of the Indo-Pakistan borderlands', *South Asian Archaeology*, 1977, Paris, p 473.

44 V.M. Masson and V.I. Sarianidi, *Central Asia: Turkemenia before the Achaemenids*, London, 1972, p 36.

45 Prushotam Sing, *The Neolithic Cultures of West Asia, p 68.*

46 Prushotam Sing, *The Neolithic Cultures of West Asia*, p 105.

47 Prushotam Sing, *The Neolithic Cultures of West Asia*, p 25.

48 Prushotam Sing, *The Neolithic Cultures of West Asia*, p 186.

49 G. Stacul, 'Excavations in a rock-shelter near Ghaligai, Swat', *East and West*, Vol. 17, Nos. 3 and 4, 1967; 'Excavations near Ghaligai and chronological sequence of protohistorical cultures in the Swat Valleys', *East and West*, Vol. 19, Nos. 1 and 2, 1969; ''New archaeological evidence on north-western Indo Pakistan, 3rd-4th millennium B.C.', *East and West*, Vol. 24, Nos 3 and 4, 1974; B. and F. Allchin, *The Rise of Civilization in India and Pakistan*, pp. 114-15.

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give and take relationship seems to have had developed only up to limited proportions so that what was used or produced at a certain place was not always made or found in Kashmir or vice–versa. For example we had no fish-hooks or shouldered celts in Kashmir as were found in China like-wise they had no stone points as were found in Kashmir. Doubtlessly Kashmir culture had its own indigenous features but then the exotic influences rendered it to appear as an amalgam of East–West cultures. Since these widely varying foreign 'imports' did not often synchronize in terms of time; speed and chronology, some Neolithic site, around Kashmir, might have had played a host by welding them together, depending certainly how close it was to Kashmir and how attractive or useful those distinct foreign elements were for adoption in the conditions of Kashmir.

Such a site would have been the one which on the one hand was recipient of the West-Asian influences in agricultural pattern and on the other hand was influenced by the West Asian-Chinese type pit houses. Kashmir herself could have claimed to be such a place where such intermingling of East-West influences took birth but then non synchronization of dates does not allow it to be so. To say precisely, we are unable to locate such a place. Nevertheless, this does not mean that the Neolithic culture did not entail foreign reinforcements directly from a primary source.

Had it not been there, the bucranian motif painted on a Kot–Dijian type pot found at Burzahom (period I)[50] would have been a remote possibility. Sankalia rightly argues that this Burzahom painted pot had its origin either in Iran or Sind and Punjab.[51] Since similar type of a pot with the motif has been found simultaneously from the pre-Harappan layers at Kot-Diji, Banawali, Sarai Khola, etc it is very possible that Sarai Khola being comparatively nearer to Kashmir might have as such remained the intermediary channel or the primary source of transmission of this pre-Harappan element to Kashmir.

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[50] Even though Khazanchi and Dikshit reports that it was found from period II at Burzahom, *Puratattva,* No. 9,1980, yet S.S Saar report its find spot from the layers of period I at Burzahom, *Archaeology* , pp 13-14.

[51] H.D. Sankalia, *Pre and Protohistory of India and Pakistan*, p.303.

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The pre Harappans were contemporary to the Burzahomites at the early Neolithic stage, and elements like the painted pot get easily imported in a culture which at this time had no pottery or had means to make such wheel–made pottery.[52] On the other hand metal objects found at Burzahom and Gofkral were made by the natives themselves but they employed the technology of the Harappans for that purpose, certifying thereby certain contacts established somewhere around 2000 BC through trade or other type of links between the advanced Harappans and the Kashmiris. Nevertheless, such contacts were restricted too as no major elements of their urban culture were established in Kashmir anymore.

One can safely argue that the natives of Kashmir were themselves instrumental in evolving and giving birth to the Neolithic culture there. While withstanding the odds of nature they ventured to carve out for themselves a permanent space in the scenic environs of the Valley on the karewa tops overlooking vast plains and eventfully took to agriculture and husbandry as more reliable sources of sustenance. The settlements they made were characterized by a wide range of hectic socio-economic and culture activities among their social beings. Though these activities were conducted as per their nature of culture and local conditions yet the role of their neighbours in the development of their culture cannot be ruled out keeping in view the relations that the Neolithic people of Kashmir had established with them at one or the other period of time. The nature of such relations cannot be explained exactly.

One can think that trade may have been one such aspect to develop relations but then there is no evidence which could suggest what might have been traded by the respective parties even though hundreds of beads from Harappans were found at Burzahom in lieu of

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[52] Even though Neolithic Kashmir shares some other cultural elements with Sarai Khola like in burnished pottery, ground stone tools, storage pits, etc. yet when all these things were there at Sarai Khola, Neolithic Kashmir was yet to take birth, and after it happened we had no pottery for the first 600 years in Kashmir and when black burnished pottery was made in Kashmir around 2000 BC the Neolithic culture was no more existing in Sarai Khola instead they had by then passed though cultural stages of the pre Harappan and mature Harappan.

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what is unknown. What the Neolithians possibly could have traded was the Himalayan wood as they cleared forests for their agricultural operations and the Harappans had a requirement for it. In that case the wooden logs were transported through the river Jehlum, which ultimately joins the Indus river system on which many Harappan sites were located. Such an inference may have been true on the Western side while the Northern link of the Chinese had nothing to import from Kashmir around 2000 BC if it is certain that wheat and barley cultivation was introduced there in 1300 and not around 2000 BC. One may follow the argument that *ideas have wings* but necessarily men were to be involved to become the *"wings"* to carry the ideas and they had to travel and cross the natural barriers for a definite reason.

However, such relations left definite imprints on their culture. Significantly most of the exotic influences might have not reached Kashmir directly but via some kind of intermediary source which in itself would have represented the features of being a hybrid culture centre. True for the establishment of West Asian farming pattern the Bulaclistan site at Mehargarh exemplify a spectacular nuclear centre where from the cultural traits reached to not necessarily all north west Indian sites but at least up to Kile Gul Mohammad and Gumla. Nevertheless, this nuclear area fostered such processes which according to Gupta 'inspired chain reaction giving birth to the Neolithic complexes in Punjab,[53] at Sarai Khola in Potwar and Jalilpur in Multan, not withstanding their localized and distinct cultural identity. Nonetheless, what was common in all these places was indeed imminent in the gradual and simultaneous development of the Chalcolithic phenomenon which itself stemmed from the Neolithic culture in the whole region.

However, Kashmir seems to have been receptive of this region's wide technological development in many respects yet it could not give rise to the establishment of Chalcolithic culture. True that only little metallurgical activity was conducted there and that too around 2000 BC, thereby implying that the idea regarding certain characteristics of

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[53] S.P Gupta, *Disposal of the Dead and Physical types in Ancient India*, New Delhi 1972, p. 263.

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the Chalcolithic culture had started floating into Kashmir but not disturbing the existing Neolithic formation, possibly because Harappans themselves were getting removed from their major urban habitational places established in the sub-Continent. What is, therefore, essentially significant is that the Neolithic people of Kashmir on account of contacts, however tenuous, showed no scruples in appreciating the foreign influences and ideas for the sake of promoting and guaranteeing the survival of its own culture over a long period of time. As a result of this kind of approach their mental horizons widened though they continued to live their life in their own way and practice dogmas and rituals they were able to establish for themselves. All the same, they retained and they developed several unique characteristics which were unparalleled when compared with the cultures that obtained there around.

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